RESEARCH TRIANGLE INSTITUTE

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FINAL REPORT

Impact of North Carolina Ports on the North Carolina Economy

by

Paul F. Mulligan

and

Raymond L. Collins

RESEARCH TRIANGLE PARK, NORTH CAROLINA 27709

March 31, 1977

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Dear Ms. Cotton:

Enclosed is a copy of the study you requested: "Report of Impact
of the North Carolina Ports on the State Economy."

The North Carolina Department of Transportation printed the study
using the cover pages that I xeroxed and enclosed. We have no extra
copies of this version. The copy attached is identical except for
this small change. I also have enclosed a copy of the Executive
Summary.

Sincerely,

Paul F. Mulligan, Ph.D.
Economist

PFM/pj

Enclosure

ORTH CAROLINA DEPARTMENT OF TRANSPORTATION

FINAL REPORT

REPORT OF IMPACT OF THE NORTH CAROLINA
PORTS ON THE STATE ECONOMY

1975

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RESEARCH TRIANGLE INSTITUTE
CENTER FOR DEVELOPMENT AND RESOURCE PLANNING
RESEARCH TRIANGLE PARK, NORTH CAROLINA

FINAL REPORT

RTI Project 26N-855

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North Carolina Economy

by

Paul F. Mulligan

and

Raymond L. Collins

Prepared for:

North Carolina Department of Transportation and Highway Safety
Raleigh, North Carolina

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Chapter 1

Introduction

This report documents the impact of the two deep-water Ports of
North Carolina on the economy of the State. Their significant impact
is measured as effects on employment, income, industrial development,
and other economic factors.

The study to measure the economic impact of the two Ports, Morehead
City and Wilmington, was accomplished for the North Carolina Department
of Transportation and Highway Safety by the Research Triangle Institute
(RTI). The primary objectives of the study were:

(1) To increase knowledge about the significance of the State
    Ports to the rest of the State's economy;

(2) To provide information about future opportunities for the
    Ports to promote the economy;

(3) To improve the probabilities of making sound decisions about
    investments at the Ports.

The State Ports Authority, which operates the two Ports, was charged
by the General Assembly with the overall mission of promoting and facilitating
commercial water transportation of all types in the State. The primary
intent of the General Assembly in this instance was to stimulate and promote
economic development throughout North Carolina, and especially in the
coastal region of the State where personal income is generally lower.
Stimulation and promotion of economic development was acknowledged through-
out the study to be the ultimate goal of the State Ports and the impact
measures used were directly related to this goal.

This report provides considerable information about the Ports, the
cargoes that they handle, the economic impact of their activities, and
other important information. It is presented in eight chapters, beginning
with this brief introductory chapter.

Chapter 2 describes the Ports as part of the State and the national economies. Additionally, the chapter provides a description of the Ports as a subsystem of national and international trade systems.

Chapter 3 identifies the significant commodities at the Ports and provides a detailed description of the movements of several of these commodities. Export commodities are described in terms of their origin or source and import commodities, in terms of their end-use or destination. This chapter is divided into separate sections for Morehead City and Wilmington.

Chapter 4 is concerned with the beneficial economic effects of the Ports. This chapter presents estimates of employment and income benefits. Additionally, savings to shippers as a result of using Ports in North Carolina are estimated. Another type of benefit discussed in Chapter 4 is the industrial location effects of the State Ports. Where data are available to support the calculations, the beneficial effects of the Ports are shown for each of the State's 17 Multi-County Planning Regions.

Chapter 5 identifies the factors which the study has concluded are the main determinants of the volume of commodities flowing through the Ports of North Carolina. Such factors as the levels of the national and State economies and their relationship to Port activities are discussed.

Next, Chapter 6 presents the study's projection of cargo volumes for 1980 and 1990. This chapter also presents information about the major factors that are thought to determine volumes for major types of cargo.

Chapter 7 presents a discussion of the general benefits to be derived from alternative port development strategies to attain cargo levels different from those projected. Five alternative strategies for the future are presented and analyzed in terms of their impact on the State's economy.

The final chapter, Chapter 8, presents conclusions and the recommendations derived during the study. The recommendations were developed from an analysis of the conclusions reached in the study. They are, to some extent, general and are intended to give direction to those who make future decisions about investments for the Ports and about strategies for their development.

The report concludes with two appendices: Appendix A - Specified Commodities Excluded from Liner-Type Items, and Appendix B - Glossary.

Chapter 2

Description of the North Carolina Port Activities

This Chapter describes the North Carolina Ports in quantitative terms. Section A examines the total flows of cargo through the North Carolina Ports over both publicly owned and privately owned docks. Section B compares the North Carolina Ports to Hampton Roads, Virginia and Charleston, South Carolina. Section C looks at the degree to which North Carolina cargo (originating or destined) flows through the North Carolina Ports.

A. Total Flows Through the North Carolina Ports

1. Publicly Owned Docks

The total quantity of cargo moving through the Ports has grown substantially since 1952 when the SPA began operations. Table 2-1 describes the cargo moving over the publicly owned State Docks at Wilmington and Ocean Terminals in Morehead City from 1952 to 1972, including foreign, coastwise, military, and petroleum products. The total cargo handled was about constant from 1953 to 1963 with substantial year to year fluctuations. Consistent growth began in 1964 and has continued through 1972, although minor decreases occurred in 1967 and 1971.

The annual rate of growth in total tonnage from 1953 (the first full year) to 1972 was 8.2 percent (see Table 2-2). The first decade of growth, 1953-1962, was very low at 1.7 percent annually, while the second decade was much higher at 16.1 percent annually, especially after 1966 when the annual growth rate was 22.8 percent. The recent trends will be examined more closely by Port and by commodity in Chapter 3.

Imports exceeded exports in 1972 for both Ports combined although this represents a reversal of earlier years when exports were much greater. In general, a balance is desirable because it makes a Port more attractive to ships, which can then both drop off and pick up cargo. The tables dealing with each of the Ports separately are more informative about the ratio of imports to exports. Imports

Table 2-1

Activities at the Two North Carolina State Port Terminals

Year	Combined Waterborne Commerce (Thousand Short Tons)				Number of Transportation Units		
	Grand Total	Imports	Exports	Coastwise a/	Ships b/	Railcars	Trucks
1952	427	22	c/	405	67	N/R	N/R
1953	621	92	37	492	96	N/R	N/R
1954	676	28	89	559	130	N/R	N/R
1955	736	37	232	467	166	1,924	2,888
1956	690	27	308	355	192	2,885	1,936
1957	716	35	323	358	269	3,195	2,901
1958	671	73	176	422	345	4,282	4,699
1959	732	136	246	350	416	5,299	8,350
1960	861	126	328	407	480	6,404	9,547
1961	895	100	359	436	577	9,418	7,051
1962	725	133	242	350	606	4,890	14,065
1963	721	180	246	295	687	5,985	15,326
1964	874	201	314	359	699	7,522	16,836
1965	962	232	312	418	675	7,451	18,511
1966	1,002	326	333	343	739	8,626	25,410
1967	987	355	328	304	702	8,644	21,142
1968	1,434	527	414	493	736	10,659	28,725
1969	1,958	482	583	893	672	8,506	36,345
1970	2,455	572	746	1,137	697	8,188	35,509
1971	2,362	557	576	1,229	599	8,214	33,402
1972	2,759	814	608	1,337	770	9,132	44,976

a/ Includes petroleum, asphalt and military at Morehead City.

b/ Excludes military ships.

c/ Less than 1,000 tons.

N/R Not Recorded.

Source: North Carolina State Ports Authority.

Table 2-2

Annual Compound Rates of Growth in Tonnage at State Port
Terminals of Morehead City and Wilmington
(Percent)

Years	Imports	Exports	Total Foreign	Coastwise	Grand Total
Combined North Carolina Ports					
1953-1972	12.2	15.9	14.5	2.3	8.2
1953-1962	4.2	23.2	14.7	-1.6	1.7
1963-1972	18.3	10.6	14.3	7.6	16.1
1967-1972	18.1	13.1	15.8	13.7	22.8
Wilmington					
1953-1972	13.1	9.4	12.3	15.4	15.9
1953-1962	7.0	21.0	12.4	15.9	13.7
1963-1972	18.0	0.2	12.3	11.7	17.3
1967-1972	16.3	-7.3	9.5	22.4	20.7
Morehead City					
1953-1972	8.0	21.8	16.2	0.5	4.3
1953-1962	-16.8	27.4	13.6	-2.1	-2.4
1963-1972	21.2	18.1	18.5	5.1	14.6
1967-1972	45.1	31.3	33.1	8.7	26.1

Source: Research Triangle Institute.

have grown rapidly at the two Ports combined, especially since 1963. The annual rate of growth during the first decade was 4.2 percent, but it rose to 18.3 percent in the second decade. The pattern of growth of exports is somewhat different. Exports grew rapidly from 1953 to 1957 and then declined to 1962. Nevertheless, the annual growth rate during the entire period was 23.2 percent. The rate during the second decade was lower at 10.6 percent annually, but it includes declines at Wilmington and rapid growth at Morehead City.

Coastwise shipping consists primarily of phosphates, petroleum and asphalt at Morehead City and chemicals at Wilmington. Some petroleum products at Morehead City are imported, but are placed in the coastwise category because they distort the picture of general imports. Military movements at Morehead City are also included as coastwise in this table because they do not fit into the export or import categories. Coastwise movements have grown substantially at both Ports, particularly at Wilmington where the Wilmington Chemical Terminal handles large quantities of liquid chemicals. The SPA receives a throughput charge on these chemicals, which is considerably less per ton than revenues associated with dry cargo; the SPA does not have any expenses associated with the Chemical Terminal, however. The inbound movements of phosphate at Morehead City boosted coastwise cargo greatly and were responsible for the large surge of total cargo in 1968 and 1969 because phosphate is counted as both coastwise inbound cargo and as an export.

Table 2-3 demonstrates the growth in total cargo at the State docks in Wilmington by the four major categories of cargo. Coastwise cargo, particularly since 1969, has exhibited very rapid growth. Imports have also grown rapidly. It should be noted, however, that the surge in 1972 was caused in part by several commodities that had moved in a coastwise mode in the past but were imported in 1972. The total quantity exported has decreased since 1968 because of changes in the scrap metal market which lowered exports. An increase occurred in 1972 because of a large jump in tobacco. Imports have grown steadily at Wilmington since 1954, and especially since 1962. They now are roughly five times as great as exports. The imbalance is

Table 2-3

Activities at the State Ports Terminal, Wilmington

	Waterborne Commerce (Thousand Short Tons)			Coastwise		Number of Transportation Units		
Year	Grand Total	Imports	Exports	Inbound	Outbound	Ships	Railcars	Trucks
1952	24	22	0	0	1	16	N/R	N/R
1953	96	70	26	0	0	45	N/R	N/R
1954	105	27	78	0	0	73	N/R	N/R
1955	251	36	215	0	0	115	1,924	2,888
1956	279	27	251	0	0	113	2,885	1,936
1957	306	33	274	0	0	171	3,195	2,901
1958	184	73	111	0	0	216	2,702	3,433
1959	284	131	153	0	0	254	5,204	4,392
1960	352	119	227	3	4	311	6,441	5,505
1961	350	93	254	0	4	352	6,327	5,910
1962	304	129	145	11	19	409	9,562	3,800
1963	379	163	142	42	31	451	11,548	4,329
1964	455	191	196	54	15	451	12,657	5,690
1965	479	226	163	59	31	417	13,912	5,194
1966	582	319	202	57	3	475	14,490	6,235
1967	622	341	210	60	11	521	15,714	6,422
1968	857	491	215	101	50	541	23,509	7,935
1969	885	431	145	180	128	465	27,026	6,025
1970	1,128	533	160	259	177	464	28,565	4,916
1971	1,216	496	103	347	269	420	28,307	5,684
1972	1,594	724	144	443	284	567	36,675	7,216

N/R Not Recorded.

Source: North Carolina State Ports Authority; RTI.

not quite as unfavorable as it seems because some imports cannot be readily offset by exports. For example, 102 thousand tons of glycol and xylene traveled in tankers in 1972; much of the 176 thousand tons of lumber and plywood came from origins where there is little demand for a backhaul. Of course, the ships often go from Wilmington to other places before they return to the lumber and plywood areas.

The tonnages of imports, exports and coastwise shipping at Morehead City are listed in Table 2-4 for various years. Total tonnage did not grow at all from 1952 through 1967 because declines in asphalt, petroleum and military offset increases in imports and exports. The tonnage grew quickly beginning in 1968 because of both inbound coastwise and export movements of phosphate. The import and export columns show that growth has occurred at Morehead City in various commodities that produce substantial revenues (unlike asphalt and petroleum). The principle imports now are lumber, fishmeal and tobacco. Exports are phosphate, tobacco, woodpulp and some lumber. The Port is still very specialized but has diversified some over the years.

2. Public and Private Facilities

Cargo through the North Carolina Ports moves through private terminals or across the docks of the State Ports Authority. The State Ports Authority is required by law to promote all waterborne commerce in North Carolina regardless of terminals used. For this reason, some attention has been paid to cargo that moves over private docks. Another reason is that comparisons with ports in other states can be made only in terms of total cargo through the ports. The South Carolina and Virginia Ports Authorities only publish data on operations of the total ports, unlike the North Carolina State Ports Authority which only publishes data on operations over the publicly owned docks.

The great majority of cargo moving through the Port of Morehead City is handled by Ocean Terminals of the State Ports Authority. At Wilmington, however, only about 20 percent of the total cargo moves over the State Docks of the State Ports Authority. Table 2-5 sets out the total tonnages handled at the Ports and the tonnage handled by the State Ports Authority. The U. S. Army Corps of Engineers publishes

Table 2-4

Activities at the State Ports Terminal, Morehead City

| | | Waterborne Commerce (Thousand Short Tons) | | | | | | Number of Transportation Units | | |
| | Grand | | | Coastwise | | Asphalt & | | | | |
Year	Total	Imports	Exports	Inbound	Outbound	Petroleum a/	Military	Ships b/	Railcars	Trucks
1952	404	1	0	0	0	367	37	51	N/R	N/R
1953	525	21	11	0	0	405	88	51	N/R	N/R
1954	571	1	11	0	0	348	211	57	N/R	N/R
1955	485	2	17	0	0	280	187	51	N/R	N/R
1956	411	0	56	0	0	261	94	79	N/R	N/R
1957	410	2	49	0	0	265	93	98	N/R	N/R
1958	488	0	65	0	0	289	134	129	849	1,997
1959	448	5	93	0	0	281	70	162	907	3,146
1960	508	7	101	0	0	275	125	169	899	3,106
1961	545	7	106	0	0	251	182	225	1,141	3,091
1962	420	4	97	0	0	171	148	197	1,090	4,503
1963	342	16	104	0	0	171	50	238	1,656	3,777
1964	419	10	118	0	0	172	119	248	1,832	4,179
1965	483	6	149	0	0	265	63	258	2,257	4,599
1966	421	7	131	0	0	340	42	264	2,391	10,920
1967	366	14	119	0	0	195	39	181	2,222	5,423
1968	577	36	199	103	3	205	31	195	2,724	5,216
1969	1,073	51	438	327	0	228	29	207	2,481	9,319
1970	1,327	39	586	380	1	303	18	233	3,272	6,944
1971	1,147	61	473	314	0	291	8	179	2,530	5,095
1972	1,165	90	463	311	2	291	8	203	1,916	8,301

a/ Includes foreign and coastwise.

b/ Nonmilitary ships only.

N/R Not Recorded.

Source: North Carolina State Ports Authority; RTI.

Table 2-5

Relationship of Public and Private Sectors
at Wilmington and Morehead City

	1960	1965	1968	1971
Port of Wilmington (Thousand Short Tons)				
Total	4,180	3,986	4,229	6,051
Foreign	754	950	1,579	2,619
Imports	472	755	1,383	2,458
Exports	282	195	196	161
Domestic	3,426	3,036	2,650	3,432
State Ports Terminal at Wilmington (Thousand Short Tons)				
Total	352	479	857	1,216
Foreign	346	389	706	599
Imports	119	226	491	496
Exports	227	163	215	103
Domestic	6	90	151	617
State Ports Terminal Tonnage as Percent of Port of Wilmington				
Total	8.4	12.0	20.3	20.1
Foreign	45.9	40.9	44.7	22.9
Imports	25.2	29.9	35.5	20.2
Exports	80.5	83.6	100.0[a]	64.0
Domestic	0.2	3.0	5.7	18.0
Morehead City Harbor (Thousand Short Tons)				
Total	679	693	903	1,290
Foreign	294	216	344	677
Imports	217	134	167	232
Exports	77	82	177	445
Domestic	385	477	559	613
State Ports Terminal at Morehead City (Thousand Short Tons)				
Total	508	483	577	1,146
Foreign	383	420	396	693
Imports	282	271	197	220
Exports	101	149	199	473
Domestic	125	63	181	453
State Ports Terminal Tonnage as Percent of Morehead City Harbor				
Total	74.8	69.7	63.9	88.8
Foreign	100.0[b]	100.0[b]	100.0[b]	100.0[b]
Imports	100.0[b]	100.0[b]	100.0[b]	94.8
Exports	100.0[b]	100.0[b]	100.0[b]	100.0[b]
Domestic	32.5	13.2	32.4	73.9

[a] The SPA included rations and some other military cargo as exports that the Corps of Engineers does not record.

[b] The State Ports Authority figure exceeded the Corps of Engineers figure; reconciliation was not possible.

Sources: U.S. Department of the Army, Corps of Engineers. Waterborne Commerce of the United States: Part 1, Waterways and Harbors, Atlantic Coast. Vicksburg, Mississippi: Corps of Engineers, various years.

North Carolina State Ports Authority.

data for all cargo moving through the Ports. As noted, the SPA publishes data only for the publicly owned docks. The difference is handled by the private docks. Imports, exports, total foreign and total domestic tonnage are listed; tonnage handled by the State owned docks is calculated as a percentage of the total cargo through the Ports. These figures are given for 1960, 1965, 1968 and 1971 in order to demonstrate trends.

Total tonnage at the Port of Wilmington fell from 1960 to 1965, recovered by 1968, and then grew rapidly in 1971. The foreign tonnage, especially imports, grew rapidly and regularly during this period. Exports actually declined during the entire period, while domestic cargo declined in 1968 and then rose again in 1971. The SPA figures show a much more regular increase during the period, especially in imports and domestic cargo. The State Ports Authority share of total cargo increased from 1960 to 1968 and then was constant through 1971. The composition of the shares changed drastically, however, as domestic shipments through the State owned terminals increased, and imported petroleum products replaced the domestic supplies moving through the private terminals. These petroleum products account for a very large part of the tonnage moving over the private docks. Thus, the public share of imports actually declined from 1968 to 1971 even though the actual quantities increased greatly.

As mentioned above, petroleum products, especially gasoline, kerosene, fuel oil, and asphalt account for the largest part of the cargo moving over the privately owned terminals. These commodities are all liquids and are pumped from tankers into storage tanks. Very little employment is actually generated by the unloading and storage process, but a significant number of truck drivers are needed to distribute the fuel. Iron ore is unloaded at a private bulk facility and transferred to barges, which are then brought to Georgetown, South Carolina where a small steel mill is located. Other significant products handled by the private terminals include prepared animal feed,

pulpwood logs, alcohol and other chemicals, cement, coke and molasses. All these items are relatively low value commodities and are handled by equipment that does not generate significant levels of employment. Nevertheless, these commodities, especially petroleum products, are an important part of the commerce on the Cape Fear River and help to justify the improvement and maintenance of the channel.

The Morehead City Harbor is dominated to a much larger degree than Wilmington by the State owned facilities. The percentage of total cargo moving over the State owned Ocean Terminals was 75 percent in 1960, fell to 64 percent by 1968 and then jumped to 89 percent in 1971. The State owned facilities account for almost all the imports and exports that move through the Ports and an increasing share of the domestic shipments. The primary commodity moving over the private docks is jet fuel intended for the Cherry Point Marine Air Station. Kerosene also moves through this privately owned facility. The SPA data on imports and exports exceed the Corps of Engineers data for the entire harbor. This discrepancy is probably due to a different classification of petroleum shipments since data for total cargo movements from the two sources are consistent.

B. Comparison with Ports in Neighboring States

  1. Introduction

The previous section dealt with trends in cargo through the North Carolina Ports; this section compares them to ports in neighboring states. Although the actual frame of reference for this study is the measurement of benefits to the State's economy, ports in other states were considered for several reasons. For one, the North Carolina Ports actively compete with these ports for much of the same business. Projections of volume therefore depend on examination of this competition. For another, trends in cargo at these ports will indicate how successful the North Carolina Ports have been in getting this business. Such findings may help provide guidelines for future public investments if measures of the return from public expenditures on other activities

are not available. That is, if in comparison with other ports the
North Carolina Ports were relatively unsuccessful in getting business,
one might argue that the other ports are providing the necessary
services to North Carolina firms. This implies that the only reason
to capture such cargo for the State is for improvement of ocean
service.

2.   Total Cargo

Table 2-6 contains tonnage data for imports, exports, and total
cargo (including domestic shipments) moving through the ports of Hampton
Roads (Norfolk, Newport News, Portsmouth, and Cheasapeake), Morehead
City, Wilmington, and Charleston. The combined tonnage data from the
two North Carolina Ports are also presented as a total, as is the total
for all four ports. Three years were selected for inclusion in the
table in order to demonstrate trends. The figures include shipments at
both public and privately owned docks and terminals, and both bulk and
general cargo. Because bulk commodities such as grain, coal, and petro-
leum products are included, the figures fluctuate rather widely. The
inclusion of domestic shipments, which often occur in very large
quantities, also makes a difference. For example, exports increased
at Hampton Roads from 26 million tons in 1960 to 35 million tons in
1965 largely because of the coal shipments. Total shipments increased by
fewer than five million tons during the period because domestic ship-
ments declined substantially and imports also fell.

Examination of all four ports shows clearly that Hampton Roads
is by far the largest in terms of total tonnage, exports and imports,
while Morehead City is by far the smallest in total cargo and imports,
but larger than Wilmington in exports.

The rate of growth varies from one port to another by time period
and by type of cargo (import, export, other). Annual growth rates
calculated from 1965 to 1971 show that the combined North Carolina
Ports have grown more rapidly than the other two ports in terms of
total tonnage. Import growth is especially outstanding, particularly
at Wilmington. Morehead City is outstanding in exports, while Wilmington
has lagged behind the other three ports. Imports at Morehead City

2-11

Table 2-6

Tonnage and Growth Rates for Ports of Hampton Roads,
Wilmington, Morehead City, and Charleston

Ports	Waterborne Commerce (Thousand Short Tons)			Annual Rates of Growth(%)
	1965	1968	1971	1965-1971

Hampton Roads

Total	54,106	53,385	59,962	1.7
Imports	4,308	4,195	7,734	10.2
Exports	35,072	35,651	36,239	0.5
Domestic[a/]	14,726	13,539	15,989	1.4

Morehead City

Total	693	903	1,289	10.9
Imports	134	167	232	9.6
Exports	82	177	445	32.6
Domestic[a/]	477	559	612	4.2

Wilmington Harbor

Total	4,742	5,001	6,827	6.3
Imports	755	1,383	2,458	21.7
Exports	194	196	161	-3.1
Domestic[a/]	3,793	3,422	4,208	1.7

Wilmington & Morehead

Total	5,435	5,904	8,116	6.9
Imports	889	1,550	2,690	20.3
Exports	276	373	606	14.0
Domestic[a/]	4,270	3,981	4,820	2.0

Charleston

Total	4,950	6,390	6,946	5.8
Imports	1,404	2,103	2,706	11.6
Exports	536	915	733	5.4
Domestic[a/]	3,010	3,372	3,507	2.6

Four-Port Total

Total	64,491	65,679	75,024	2.6
Imports	6,601	7,848	13,130	12.1
Exports	35,884	36,939	37,578	0.8
Domestic[a/]	22,006	20,892	24,316	1.7

[a/] Includes coastwise, internal and local tonnage.

Source: U.S. Department of the Army, Corps of Engineers. Waterborne Commerce of the United States: Part 1, Waterways and Harbors, Atlantic Coast. Vicksburg, Mississippi: Corps of Engineers, 1966, 1969, 1972.

have grown more slowly than at the other three ports but still achieved a rate of 9.6 percent annually from 1965 to 1971.

Table 2-7 presents the share of the four port total tonnage accounted for by each of the ports and by the combined North Carolina Ports. The two North Carolina Ports increased their share of total tonnage from 8.4 percent in 1965 to 9.0 percent in 1968 and 10.8 percent in 1971. Both import and export shares grew substantially, while the share of the other shipments remained constant. The North Carolina share of imports is about equal to Charleston's and about one-third of Hampton Roads. The share of exports is slightly smaller than Charleston's and a very small fraction of Hampton Roads, which is dominated by coal. Morehead City's share of imports declined slightly, while its share of exports increased sixfold. Wilmington's share of imports increased from 11.4 percent in 1965 to 18.7 percent in 1971, while its share of exports fell by a third; the absolute amount of exports also declined.

3. Liner-Type Cargo

An effort was made to measure general-type cargo as opposed to bulk commodities because general-type cargo generates much more employment and income than bulk items (employment and income are major economic benefits that were investigated in this study). A definition of general cargo was taken from a recent study of domestic transportation of goods in foreign trade. This study was concerned only with "liner-type" commodities, which are similar to items often thought of as general cargo. Liner-type refers to all items except those specified such as wheat, corn, cotton, oilseeds, iron ore, coal, nonferrous metal scrap, petroleum, phosphate rock, stone, sand, and gravel. The commodities specified are listed in Appendix A.

Amounts of liner-type imports and exports are listed in Table 2-8; domestic shipments are not considered. The figures are much lower than in the previous table, especially at Hampton Roads. The combined North Carolina Ports grew faster than Charleston from 1965 to 1971 in terms of total imports and exports and substantially faster than Hampton Roads. The North Carolina Ports did particularly well in imports. Morehead City was the fastest growing of the four ports, while Wilmington grew at the

Table 2-7

Percentage Shares of Tonnage through the Ports of
Hampton Roads, Morehead City, Wilmington,
and Charleston

| | Shares of Four-Port Total Tonnage (Percent) | | |
	1965	1968	1971
Hampton Roads			
Total	83.9	81.3	79.9
Imports	65.3	53.5	58.9
Exports	97.7	96.5	96.4
Domestic[a]/	66.9	64.8	65.8
Morehead City			
Total	1.1	1.4	1.7
Imports	2.0	2.1	1.8
Exports	0.2	0.5	1.2
Domestic[a]/	2.2	2.7	2.5
Wilmington Harbor			
Total	7.3	7.6	9.1
Imports	11.4	17.6	18.7
Exports	0.6	0.5	0.4
Domestic[a]/	17.2	16.4	17.3
Wilmington & Morehead			
Total	8.4	9.0	10.8
Imports	13.4	19.7	20.5
Exports	0.8	1.0	1.6
Domestic[a]/	19.4	19.1	19.8
Charleston			
Total	7.7	9.7	9.3
Imports	21.3	26.8	20.6
Exports	1.5	2.5	2.0
Domestic[a]/	13.7	16.1	14.4
Four-Port Total			
Total	100.0	100.0	100.0
Imports	100.0	100.0	100.0
Exports	100.0	100.0	100.0
Domestic[a]/	100.0	100.0	100.0

[a]/ Includes coastwise, internal and local tonnage.

Source: Table 2-6.

Table 2-8

Imports and Exports of Liner-Type Cargo Through the Ports of
Hampton Roads, Wilmington, Morehead City, and Charleston

	Liner-Type Cargo (Thousand Short Tons)			Annual Rate of Growth(%)
	1965	1968	1971	1965-1971
Hampton Roads				
Total Foreign	2174	2924	3222	6.8
Imports	883	1303	1489	9.1
Exports	1291	1621	1733	5.0
Morehead City				
Total Foreign	87	141	309	23.5
Imports	6	33	84	55.2
Exports	81	108	225	18.6
Wilmington Harbor				
Total Foreign	602	928	1018	9.2
Imports	452	766	916	12.5
Exports	150	162	102	-6.2
Morehead City & Wilmington				
Total Foreign	689	1069	1327	11.5
Imports	458	799	1000	13.9
Exports	231	270	327	6.0
Charleston				
Total Foreign	1015	1488	1704	9.2
Imports	666	896	1009	7.2
Exports	349	592	695	12.2
Four Port Total				
Total Foreign	3878	5481	6253	8.3
Imports	2007	2998	3498	9.7
Exports	1871	2483	2755	6.7

Sources: U.S. Department of the Army, Corps of Engineers. Waterborne
Commerce of the United States: Part 1, Waterways and Harbors,
Atlantic Coast. Vicksburg, Mississippi: Corps of Engineers,
various years.

U.S. Bureau of the Census, Domestic and International Transportation
of U.S. Foreign Trade; 1970. Washington, D.C.: U.S. Government
Printing Office, 1972, pp. 1, A-1 - A-14.

same rate as Charleston. Morehead City was by far the fastest growing,
mainly because of its very low level in 1965, the base year. Wilmington's
imports grew faster than both Hampton Roads and Charleston. The export
picture is not such a success; the two Ports combined lagged behind Charles-
ton but led Hampton Roads. Morehead City exports grew more rapidly than
those at the other three ports, mainly because of fertilizer; Wilmington
exports actually declined during the period. The reason for the decline
was the reduction in scrap steel exports, which fell nationwide as
domestic steel mills began to use more scrap in new electric furnaces.
The level of benefits from these exports is not as impressive as it seems
because the phosphate fertilizer is handled mechanically, just like the
phosphate rock and other bulk commodities that were excluded, and thus
does not generate much employment or income at the Port.

The shares of liner-type commodities moving through the four
ports accounted for by each port are listed in Table 2-9. The combined
North Carolina Ports' share of total liner-type tonnage increased from
17.8 percent in 1965 to 21.2 percent in 1971. The growth of the import
share accounted for the total increase as it rose from 22.8 percent in
1965 to 28.6 percent in 1971. This share is about the same as Charleston's
and two-thirds the size of Hampton Roads. The share of exports declined
slightly from 12.3 percent in 1965 to 11.9 percent in 1971. This share
is only half the size of Charleston's and one-fifth the size of Hampton
Roads. Morehead City made considerable gains in both imports and exports
as its share of imports increased eight times and its share of exports
doubled. Wilmington increased its share of imports but lost ground in
exports. By contrast, Charleston increased its share of exports but
lost ground in imports , while Hampton Road suffered a drop in its share
of imports and exports.

C. Balance Between Flows through North Carolina Ports and the Production
    and Consumption of Goods in North Carolina
    1. Introduction
        Data about cargo that originates in or is destined for North Caro-
lina but moves through ports in other states provide useful information
for soliciting additional business for the North Carolina Ports. Such data also

Table 2-9

Percentage Shares of Liner-Type Cargos Through the Ports of
Hampton Roads, Wilmington, Morehead City, and Charleston

| | Shares of Four-Port Total (Percent) | | |
	1965	1968	1971
Hampton Roads			
Total Foreign	56.0	53.3	51.5
Imports	44.0	43.4	42.6
Exports	69.0	65.3	62.9
Morehead City			
Total Foreign	2.3	2.6	4.9
Imports	0.3	1.1	2.4
Exports	4.3	4.4	8.2
Wilmington Harbor			
Total Foreign	15.5	16.9	16.3
Imports	22.5	25.6	26.2
Exports	8.0	6.5	3.7
Morehead City and Wilmington			
Total Foreign	17.8	19.5	21.2
Imports	22.8	26.7	28.6
Exports	12.3	10.9	11.9
Charleston			
Total Foreign	26.2	27.2	27.3
Imports	33.2	29.9	28.8
Exports	18.7	23.8	25.2
Four-Port Total			
Total Foreign	100.0	100.0	100.0
Imports	100.0	100.0	100.0
Exports	100.0	100.0	100.0

Source: Table 2-8.

help to quantify the services that North Carolina Ports are performing. This information is not directly available from published statistics but was estimated by combining data from several different sources.

The analysis was done using 1970 data for "liner-type" commodities that move internationally by vessels (see Section B.3 of this Chapter for details about liner-type cargo). Ports were classified in terms of nine U.S. Customs Regions. The North Carolina Ports are in the Miami Region; in Regions to the north are Baltimore, New York and Boston. The Hampton Roads Ports fall into the Baltimore Region; Charleston is in the Miami Region.

A distinction was made between the production and acquisition of exports from North Carolina (see Table 2-10): production means that the item is known to have been produced in the State; acquisition means that the item is known to have been acquired for the export in the State but may have been produced elsewhere. That is, the exporter acquired the merchandise or assumed responsibility for it at some interior point known as the acquisition point or the transportation origin of the item. In North Carolina, production of exports that moved by ocean vessel amounted to 738,500 tons and acquisition amounted to 704,000 tons in 1970.

2.   Results

Imports and exports in tons of cargo are listed in Table 2-10. These figures are for liner-type commodities moving by vessel. The first column contains data on imports destined for North Carolina and the Customs Region through which they flowed. Eighty-two percent of North Carolina imports came through the Miami Customs Region. A smaller percentage of exports from North Carolina flowed through ports in the Miami Customs Region than was true of imports. Fifty-five percent of - exports actually produced in North Carolina used the ports in the Miami Customs Region; sixty-seven percent of exports acquired in North Carolina used these ports. The difference of 34,500 tons between production for export and acquisition of exports indicates that there was a net

Table 2-10

1970 Imports and Exports for North Carolina by Customs Regions
(Short Tons)

Customs Region	Imports for N.C.	Goods from N.C. Exported Through Various Regions	
		Production	Acquisition
Total All Regions	1,187,500[a] (100%)	738,500 (100%)	704,000 (100%)
New York	35,625 (3%)	29,540 (4%)	28,160 (4%)
Baltimore	154,375 (13%)	280,630 (38%)	190,080 (27%)
Miami[b]	973,750 (82%)	406,175 (55%)	471,680 (67%)
All Other Regions	23,750 (2%)	23,155 (3%)	14,080 (2%)

[a] According to a separate analysis by RTI, imports through the North Carolina Ports were 850 thousand tons and exports were 460 thousand tons.

[b] The Miami Customs Region consists of ports in North Carolina, South Carolina, and Georgia and some of Florida.

Source: U.S. Bureau of the Census. Domestic and International Transportation of U.S. Foreign Trade: 1970. Washington, D.C.: U.S. Government Printing Office, 1972, pp. 21, 22, 24.

movement of exports produced in North Carolina out of the State before
the exporter assumed responsibility for the shipment.

Not all the North Carolina cargo moving through the Miami Customs
Region moved through the North Carolina Ports. Liner-type imports
through the North Carolina Ports were 850 thousand tons in 1970 or
90 percent of the total recorded for the Miami Customs Region. The
survey of dock orders (see Chapter 4) indicated that approximately 29
percent of imports were destined for other states. Thus, only 610
thousand tons of imports through the North Carolina Ports were destined
for North Carolina. The remainder of North Carolina imports (1,187,500 -
610,000), came through ports in other states. This remainder of 580
thousand tons or 49 percent represents opportunities for continued
growth of the North Carolina Ports.

The export situation is more complicated because of the production
acquisition problem already mentioned. Some exports acquired in North
Carolina are produced in other states. Leaf tobacco grown in Georgia
and South Carolina but acquired for export in North Carolina is a
well known example. Of course, some tobacco grown in North Carolina
goes through the Virginia ports. Of all exports produced in North
Carolina, only 55 percent went through the Miami Customs Region ports,
and not all this cargo went through the North Carolina Ports. Liner-
type exports through the North Carolina Ports in 1970 totalled 460,000
tons, of which approximately 16 percent originated in other states.
Thus, about 390 thousand tons of exports produced in North Carolina
went through North Carolina Ports, leaving 350 thousand tons or 48
percent going through ports in other states.

In summary, for 1970 approximately 49 percent of all liner-type
imports, or 580,000 tons destined for North Carolina, used ports in other
states. Forty-eight percent of exports or 350,000 tons also used ports
in other states in that year. The total of more than 900,000 tons of
liner-type foreign cargo indicates great potential for growth in cargo
through the North Carolina Ports although it would not mean additional
manufacturing and related employment and income.

Exhibit 2-1 demonstrates vividly the "loss" of North Carolina business to ports in other states. The Baltimore Customs Region, which includes the Hampton Roads Ports, is very important for exports. The other ports in the Miami Customs Region are very important in terms of imports. These latter figures (31 and three percent for imports and exports respectively) were calculated as a residual and thus are not as reliable as the other figures on the table. That is, the percentage of total cargo moving through the North Carolina Ports to other states in 1972 was applied to 1970 liner-type imports through the North Carolina Ports. The remainder was assumed to stay in North Carolina in 1970. This remainder was the basis for the 51 percent estimate for North Carolina imports coming through North Carolina Ports. The balance of the 82 percent of North Carolina imports coming through the Miami Customs Region was assumed to come through the other ports of the Region. The 31 percent estimate of imports destined for North Carolina that is thought to enter through out-of-state ports is probably biased upward. Conversely, the 51 percent North Carolina figure is probably biased downward.
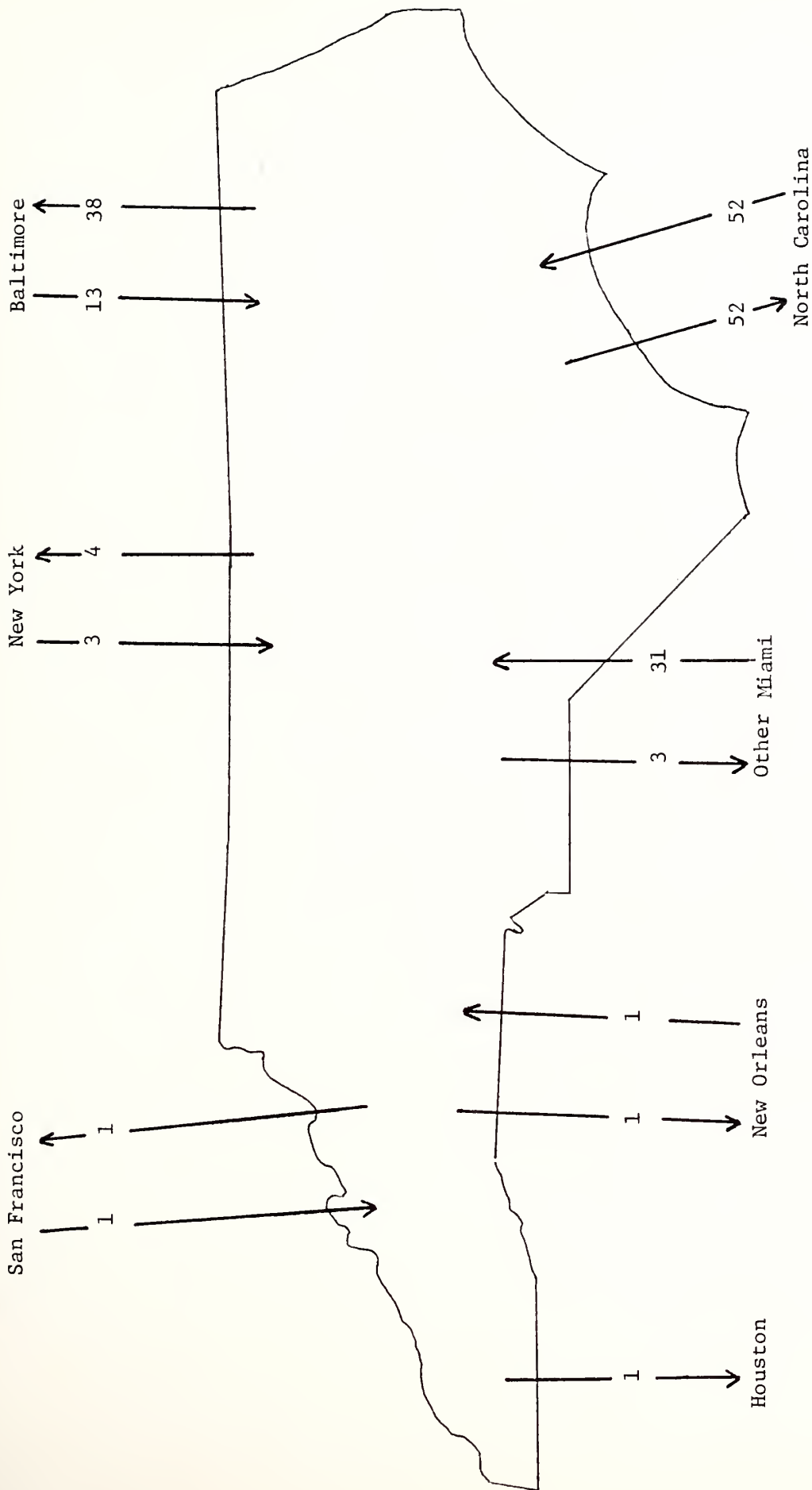
Exhibit 2-1. North Carolina Liner-Type Imports and Exports by Custom Region of Entry and Exit, 1970
(Percent)

Source: Research Triangle Institute

Chapter 3

Commodities at the North Carolina Ports

A.   General Composition of Commodity Flow

A relatively small number of commodities account for an overwhelming
share of total cargo moving through the Ports of Wilmington and Morehead
City, at both private and public docks. For this reason, some of the
leading commodities were examined in detail to assist in making projections
and in measuring economic benefits.

Table 3-1 contains estimates of the tonnages of 25 commodities moving
through the Ports of Hampton Roads, Morehead City, Wilmington and Charleston
for 1971. Totals for the two North Carolina Ports and the four ports are
given, as are the percentage shares of each commodity accounted for by each
of the Ports (Table 3-2). These commodities were selected on the basis of
their importance at Wilmington and Morehead City rather than their importance
at all four ports combined. For this reason, the North Carolina shares are
larger than they would be if a different group of commodities were selected.
The North Carolina shares range from 100 percent for iron ore, pulpwood logs,
and alcohols to 11.2 percent for residual fuel oil. The most significant
commodities in terms of tonnage at the North Carolina Ports, especially at
Wilmington, tend to be those handled at the private docks. These commodities
are residual fuel oil, gasoline, asphalt, crude tars, iron ore, pulpwood logs,
distillate fuel oil, jet fuel, kerosene, coke, and cement. Large volume
items at the public docks include phosphate rock, phosphatic fertilizers,
iron and steel scrap, alcohols and other chemicals, tobacco, lumber, pulp,
and iron and steel.

Hampton Roads accounts for the dominant share of the 25 commodities
moving through the four ports over both public and private docks. In 1971
the share was 58 percent, down from 63.5 percent in 1960 (see Table 3-3).
The Hampton Roads share of these commodities on an individual basis varies
from zero to 79 percent. The basic reason, however, for the dominance of
Hampton Roads is the very large quantities of petroleum products, particularly

Table 3-1

Flows of Selected Commodities Through the Ports of Hampton Roads, Morehead City, Wilmington, and Charleston, 1971, Public and Private Docks

(Thousand Short Tons)

Commodity	Hampton Roads	Morehead City	Port of Wilmington	Total North Carolina	Charleston	Total Four Ports
Tobacco, leaf	217	71	17	88	1	307
Iron ore and concentrates	--	--	250	250	--	250
Crude petroleum	364	69	28	97	--	461
Phosphate rock	56	190	--	190	--	246
Prepared animal feeds	4	10	57	67	5	76
Pulpwood, log	--	--	144	144	--	144
Lumber	47	20	60	81	25	152
Pulp	52	57	28	85	128	265
Paper and paperboard	62	10	24	35	201	298
Crude tar, oil, gas products	47	--	315	315	44	405
Alcohols	--	--	220	220	a/	220
Basic chemicals and prod. n.e.c.	84	a/	203	203	70	357
Nitrogenous chem. fertilizer	204	290	11	301	a/	506
Phosphatic chem. fertilizer	4	89	--	89	2	96
Fertilizer and material n.e.c.	153	100	174	274	77	505
Gasoline	1,369	7	983	990	1,248	3,607
Jet fuel	451	149	18	167	368	986
Kerosene	173	31	126	156	117	447
Distillate fuel oil	1,062	--	433	433	505	2,540
Residual fuel oil	10,523	53	1,463	1,516	1,568	13,607
Asphalt, tar, pitches	134	84	256	340	423	896
Building cement	263	4	292	296	87	645
Coke, pet. asphalts, solvents	125	37	123	159	45	329
Iron, steel shapes, exc. sheets	24	a/	62	62	66	152
Iron and steel scrap	97	--	102	102	4	203
Subtotal	16,055	1,271	5,389	6,660	4,982	27,697
All Other Commodities	43,907	19	662	681	1,964	46,552
Grand Total	59,962	1,290	6,051	7,340	6,946	74,248

a/ Less than 500 tons.

n.e.c. Not elsewhere classified.

Source: U.S. Department of the Army, Corps of Engineers, Waterborne Commerce of the United States; Calendar Year 1971: Part 1, Waterways and Harbors, Atlantic Coast. Vicksburg, Mississippi: Corps of Engineers, 1972, pp. 137-39, 162-65, 176-77.

Percentage Distribution of Selected Commodity Flows Through the Ports of Hampton Roads, Morehead City, Wilmington and Charleston, 1971, Public and Private Docks

(Percentage of Four-Port Total)

Commodities	Hampton Roads	Morehead City	Port of Wilmington	Total North Carolina	Charleston	Total Four Ports
Tobacco, leaf	70.9	23.2	5.6	28.8	0.3	100.0
Iron ore and concentrates	—	—	100.0	100.0	—	100.0
Crude petroleum	79.0	15.0	6.0	21.0	—	100.0
Phosphate rock	22.8	77.2	—	77.2	—	100.0
Prepared animal feeds	5.1	12.8	75.9	88.7	6.2	100.0
Pulpwood, log	—	—	100.0	100.0	—	100.0
Lumber	30.6	13.3	39.6	52.9	16.5	100.0
Pulp	19.8	21.4	10.5	31.9	48.3	100.0
Paper and paperboard	20.8	3.4	8.2	11.6	67.6	100.0
Crude tar, oil, gas products	11.6	—	77.6	77.6	10.8	100.0
Alcohols	—	—	100.0	100.0	—	100.0
Basic chemicals and prod. n.e.c.	23.5	—	57.0	57.0	19.5	100.0
Nitrogeneous chem. fertilizer	40.4	57.4	2.1	59.5	0.1	100.0
Phosphatic chem. fertilizer	4.4	93.6	0	93.6	2.0	100.0
Fertilizer and material n.e.c.	30.4	19.8	34.6	54.4	15.2	100.0
Gasoline	38.0	0.2	27.2	27.4	34.6	100.0
Jet fuel	45.8	15.1	1.8	16.9	37.3	100.0
Kerosene	38.7	6.8	28.2	35.0	26.3	100.0
Distillate fuel oil	63.1	—	17.0	17.0	19.9	100.0
Residual fuel oil	77.3	0.4	10.8	11.2	11.5	100.0
Asphalt, tar, pitches	14.9	9.3	28.6	37.9	47.2	100.0
Building cement	40.7	0.6	45.2	45.8	13.5	100.0
Coke, pet. asphalts, solvents	37.9	11.2	37.3	48.5	13.6	100.0
Iron, steel shapes, exc. sheets	15.6	—	40.8	40.8	43.6	100.0
Iron and steel scrap	47.8	—	50.1	50.1	2.1	100.0
Subtotal	58.0	4.6	19.4	24.0	18.0	100.0
All Other Commodities	94.3	0.1	1.4	1.5	4.2	100.0
Grand Total	80.8	1.7	8.2	9.9	9.3	100.0

n.e.c. Not elsewhere classified.

Source: Table 3-1.

Tonnage and Percentage Shares of Commodity Flows at
Hampton Roads, Morehead City, Wilmington and Charleston

(Public and Private Docks)

	Commodity Flow (Thousand Short Tons)					Percentage Shares of Four-Port Total			
Year	Hampton Roads	Morehead City	Wilmington	Charleston	Total	Hampton Roads	Morehead City	Wilmington	Charleston
	All Commodities								
1960	49956	679	4179	4975	59789	83.6	1.1	7.0	8.3
1965	54106	693	3986	4950	63735	84.9	1.1	6.2	7.8
1966	53314	656	4394	5420	63784	83.6	1.0	6.9	8.5
1967	54707	675	4013	5565	64960	84.2	1.0	6.2	8.6
1968	53385	903	4229	6390	64907	82.2	1.4	6.5	9.9
1969	58984	1177	4276	6044	70481	83.7	1.7	6.0	8.6
1970	71490	1364	5530	6875	85259	83.8	1.6	6.5	8.1
1971	59962	1290	6051	6946	74249	80.8	1.7	8.2	9.3
	25 Principal Commodities a/								
1960	14864	622	3797	4109	23392	63.5	2.7	16.2	17.6
1965	8125	651	3526	3560	15862	51.2	4.1	22.2	22.5
1966	7658	617	3739	3700	15714	48.7	3.9	23.8	23.6
1967	8556	657	3485	3599	16297	52.5	4.0	21.4	22.1
1968	9076	869	3627	4254	18126	50.9	4.9	20.3	23.9
1969	11261	1128	3774	4181	20344	55.4	5.5	18.6	20.5
1970	13944	1343	4914	5106	25307	55.1	5.3	19.4	20.2
1971.	16055	1271	5389	4982	27697	58.0	4.6	19.4	18.0
	Other Commodities								
1960	35092	56	382	866	36396	96.4	0.2	1.0	2.4
1965	45981	42	460	1390	47873	96.0	0.1	1.0	2.9
1966	45656	38	655	1720	48069	95.0	0.1	1.4	3.5
1967	46151	18	528	1965	48662	94.9	0.0	1.1	4.0
1968	44309	34	602	2137	47082	94.1	0.1	1.3	4.5
1969	47723	49	502	1863	50137	95.2	0.1	1.0	3.7
1970	57547	22	616	1769	59954	96.0	0.0	1.0	3.0
1971	43907	19	662	1964	46552	94.3	0.1	1.4	4.2

a/ The commodities involved are the leading commodities at Morehead City and Wilmington. (See Table 3-1)

Source: U.S. Department of the Army, Corps of Engineers. Waterborne Commerce of the United States: Part 1, Waterways and Harbors, Atlantic Coast. Vicksburg, Mississippi: Corps of Engineers, annual.

residual fuel oil, flowing through its ports. The North Carolina share of
these 25 commodities is 24 percent, which represents an increase from 1960
when it amounted to 18.9 percent. There was not a steady trend between
these two years and the percentage has gone as high as 26.3 percent. The
Charleston share has fluctuated over time and ranged between 17.6 percent
in 1960 and 23.9 percent in 1968.

The unlisted commodities handled at the four ports and which include
coal are treated as a residual in Table 3-2. The North Carolina share of these
commodities was 1.5 percent in 1971, which is as high as it has ever reached.
The lowest figure was 1.0 percent in the preceding year. Hampton Roads is
by far the dominant port in these commodities with 94.3 percent, largely
because of huge coal exports.

Table 3-3 contains estimates of the total volume of all commodities moving
through the four ports for the years from 1960 to 1971. The North Carolina
share increased from 7.0 percent in 1960 to 8.2 percent in 1971. This improve-
ment occurred in spite of this share falling to 6.2 percent in 1965 and 6.0
percent in 1969. The Hampton Roads share declined from 83.6 percent in 1960
to 80.8 percent in 1971.

A few commodities are very important to the State Ports; these are
discussed in the remainder of this Chapter. Three sections follow: one on
tobacco, one on phosphate, and one on all other significant commodities.

B. Tobacco

This section consists of three parts: the first part describes the
significance of tobacco at the North Carolina Ports; the second analyzes
trends in the distribution of the leaf tobacco trade among the North Carolina
and Virginia Ports; the third part consists of other considerations such
as the effects of tobacco trade on ocean service to the State Ports.

1. Tobacco at the North Carolina Ports

Tobacco is a very significant item at the North Carolina Ports
in terms of volume, tonnage, and revenues. For example, the total value
of exports and imports through the two Ports was $536.9 million in
1972; tobacco alone was $167.7 million or 31 percent. Its significance
by weight was substantial but not nearly so great. Tobacco amounted
to 182 thousand tons out of total imports and exports of 1,593 thousand
tons or 11.4 percent.

The amount of tobacco moving through the State Ports has been
rising unevenly over time. Table 3-4 lists imports and exports
of leaf tobacco through Hampton Roads, Morehead City and Wilmington.
These three harbors account for almost all United States tobacco
movements in international trade; concentration on them will highlight
trends in flue-cured tobacco exports and tobacco imports. The quantity
of tobacco exported has fluctuated from year to year in no apparent
pattern. Exports were constant during the early 60's, rose to a peak
in 1968, fell through 1971, and then rose sharply in 1972. Imports of
tobacco followed this same trend with minor differences. The total
quantities do not appear to be growing. The currency devaluation might
have stimulated exports in 1972, but it surely was not the reason for
the doubling of imports. Perhaps the jump in imports was an effort
to rebuild inventories that were at low levels because of the small
quantity imported in 1971. In any case, clear trends in the total
volume of exports and imports are not discernible.

The share of tobacco among all import and export commodities at
the North Carolina State-owned docks rose from 8.4 percent in 1960
to 11.4 percent in 1972. The intervening high was 11.1 percent in
1965, just before the large phosphate movements started. The trends
for the share of tobacco when private docks are included are similar.
For the combined ports, tobacco's share of total tonnage rose from
about 1.1 percent in 1960 to two percent in 1966 and then fell to 1.2
percent in 1971. At Wilmington, the share was below one percent during
the period, while at Morehead City the share rose from 5.5 percent in
1960 to 12.5 percent in 1965 and then fell to 5.5 percent in 1971 as
other commodities increased.

It should be emphasized that the percentages based on tonnage
underestimate the value of tobacco to the State Ports. It is much more
significant in terms of Port revenues such as handling, storage and
fumigation charges. Furthermore, tobacco exports (and imports) can attract
ships to the North Carolina Ports that might not call otherwise.

Table 3-4

Exports and Imports of Unmanufactured Tobacco, Public and Private Docks
(Thousand Short Tons)

Year	Exports				Imports			
	Hampton Roads	Morehead City	Wilming- ton	Total	Hampton Roads	Morehead City	Wilming- ton	Total
1960	209	36	14	259	48	a/	10	58
1961	200	46	13	259	76	a/	6	82
1962	188	48	13	249	66	0	10	76
1963	204	56	11	271	52	0	7	57
1964	199	60	12	271	64	0	6	70
1965	167	63	13	243	57	1	5	63
1966	199	82	13	294	86	0	7	93
1967	214	75	13	302	102	0	9	111
1968	228	78	17	323	84	9	5	98
1969	217	83	16	316	71	12	2	85
1970	186	84	15	285	70	4	6	80
1971	173	67	12	252	44	4	5	53
1972	176b/	84	59	319	75b/	17	22	114

a/ Less than 0.5 thousand short tons.

b/ The 1972 figures were calculated by multiplying the number supplied by the Virginia State Ports Authority by the ratio of the 1971 number from the U.S. Army Corps of Engineers to the 1971 number from the Virginia State Ports Authority. The original Authority figures were: exports of 176,894 tons in 1971 and 180,511 tons in 1972; imports of 52,991 tons in 1971 and 90,675 tons in 1972.

Sources: U.S. Department of the Army, Corps of Engineers. Waterborne Commerce of the United States: Part 1, Waterways and Harbors, Atlantic Coast. Vicksburg, Mississippi: Corps of Engineers, 1960-1971.

North Carolina State Ports Authority, Virginia State Ports Authority, 1972.

2. Competition for Tobacco Between Hampton Roads and the North
   Carolina Ports

Growth in tobacco volume at Wilmington and Morehead City since 1960 has occurred at the expense of the Virginia ports because the total of unmanufactured tobacco movements has remained about constant. Total exports from 1960 to 1972 are listed in Table 3-4 along with total imports. There are no significant trends in exports, but year to year fluctuations are often large. The U.S. share of the world market has been declining over time, although the absolute amounts have held constant. The expansion of the European Economic Community (Common Market) to include the United Kingdom and the 1970 changes in their agricultural policy combined to eliminate the possibility of growth in U.S. export to these countries. The Common Market took 58 percent of U.S. exports of unmanufactured tobacco in 1970. The most optimistic outlook for U.S. exports is that U.S. tobacco exports will remain at their current level due to a combination of some relaxation of the Common Market policies and growth in exports to other countries.

The North Carolina share of tobacco exports through the three ports increased in two steps since 1960. Its share grew from 19 percent in 1960 to 31 percent in 1965 and then remained about constant until 1972 when it jumped to 45 percent. This most recent increase was due to the shift of one large export company from Newport News to Morehead City and the beginning of containerized shipments from Wilmington. The future trends are not at all obvious because change occurs in discrete shifts from Virginia to North Carolina that are not predictable. The shifts depend on ocean service from the North Carolina Ports to various overseas points, container service, congestion and delays, the age of warehouses, and so forth. Export movements are controlled by a sufficiently small number of firms that these factors seem to occur in a random fashion. The next change for North Carolina Ports might be up or down.

The share of tobacco imports through North Carolina Ports is growing rapidly. Significant growth began in 1968 when the State's share of the three port total moved from eight to 14 percent. A large increase

occured in 1972 with the share rising to 34 percent. Both of the North Carolina Ports have participated in this growth. Growth is constrained to the amount imported by cigarette factories and other tobacco users and processors in North Carolina. Some cigarette factories in Virginia also use the North Carolina Ports occasionally. Because the distances and rates from the various ports to the major inland destination points are about the same, the North Carolina Ports can continue the tobacco trade only so long as good quality services are provided.

3. Other Considerations

Tobacco is the most valuable commodity handled at the North Carolina Ports and is an attractive item for ships to carry. Its value and shipping attractiveness may be attributed to the following factors: ocean rates are high (because of its value per unit weight and perishability); hogsheads are easy to handle and stable in the hold; tobacco is a clean commodity to handle. Export tobacco is sufficient inducement for ships to call at Morehead City irregularly even though they do not have any cargo to leave (and thus increase revenues). The shipping companies, the railroad, and the SPA have tried to stimulate imports by capitalizing on this irregular ship service, but with little success. The seasonality of tobacco shipments and the general lack of imports have worked against the establishment of scheduled service at Morehead City, which has no steamship service on a regularly scheduled basis.

The Port of Wilmington experienced a very large increase in tobacco exports in 1972 due to the inauguration of container ship service by Seatrain Lines. Seatrain chose Wilmington because actual and potential imports were greater there than in Morehead City as a result of its more favorable location relative to inland destination points. The export tobacco involved, which was a critical factor in Seatrain deciding to come to North Carolina, formerly moved through Morehead City. The tobacco is exported to Northern Europe in special "high cube" containers that are nine and one-half feet high and can accommodate two tiers of hogsheads. Seatrain also drops off imports in containers; this has been a factor in the increase of imports through Wilmington.

Containerization of all future tobacco exports is a definite possibility because damage to tobacco is greatly reduced when the hogsheads are packed in containers. For example, annual damages for one shipper dropped from a quarter of a million dollars to $700. Reductions of this magnitude produce great savings on insurance. Furthermore, the customer gets the tobacco when he wants it, not a claim. Another advantage is that tobacco can be sent in smaller shipments spread more evenly throughout the year. Seasonal variations in the work force in Europe are eliminated as is the need for extensive storage facilities in Europe and the U.S. port areas. Containerization of tobacco is a favorable step for shippers; it appears to be inevitable.

C. Phosphate

1. Introduction

Movements of phosphate through the North Carolina Ports are solely dependent upon Texasgulf, Inc., and independent of phosphate movements through Hampton Roads and Charleston. Some phosphate moves coastwise through Norfolk for the domestic market and a small amount is exported. This Norfolk traffic is the reason why Morehead City does not have 100 percent of the phosphate movements through the four ports.

Phosphate is of particular interest to the SPA and the North Carolina Department of Transportation for two reasons. One reason is that phosphate accounts for more than 50 percent of the total tonnage handled at Morehead City. The other reason is that $12 million was borrowed to construct facilities specifically to handle phosphate; interest and principal payments have to be made on the loan, although the Economic Development Administration (EDA) has temporarily suspended their requirements for principal payments.

2. Background

The bulk facility was planned and financed at a time when the future of phosphate rock exports looked bright. EDA was anxious for the company to begin operations because the area was economically depressed. The storage facility was designed to handle one million tons annually with ease and can accommodate up to two million tons. The loading and unloading equipment can handle more than four million tons annually.

The facility has never operated at planned volumes because the export market for phosphate rock collapsed. The demand shifted from rock to processed forms of phosphate such as dry fertilizer and phosphoric acid. The domestic market was strong and required the total amount of phosphate that could be mined so there was little incentive to promote exports. Thus, the benefits of the bulk facility did not live up to expectations.

3. Trends

Phosphate moving through the Port is handled twice and thus counted twice in the statistics. The phosphate is brought from the mine by barge and unloaded into the storage building (see Table 3-5 under Coast-wise Inbound). The phosphate is then loaded for export onto ocean going ships that lie alongside the conveyor belt. The difference between the first two columns of Table 3-5 is accounted for by inventory fluctuations. The next column is the total of phosphate followed by the total tonnage handled at Morehead City by the State Ports Authority (including phosphate). The last column is the percentage of total tonnage accounted for by phosphate. The percentage quickly reached a peak in 1969 and has been declining since, in part because of the growth of other commodities but also because of the decline in the absolute quantity of phosphate exports since 1970.

D. Other Significant Commodities

1. Introduction

A relatively small number of commodities account for the rest of the cargo moving over the public docks at Wilmington and Morehead City. This section consists mostly of analyses of these specific commodities. These analyses consist of trends in quantities, shares of the commodities at the four ports, and the origin of exports and destination of imports within the United States. The discussion of these commodities is in terms of specific ports because the North Carolina Ports are separate entities.

Table 3-5

Phosphate and Total Commodity Shipments at State Port of Morehead City,
Public Docks Only

| | Commodity Shipments (Thousand Short Tons) | | | | |
| | Phosphate | | | | Phosphate as a |
	Coastwise	Exports	Total	Total	Percent of Total
1968	103	65	168	577	29.2
1969	327	319	646	1,073	60.3
1970	379	395	774	1,328	58.3
1971	314	332	645	1,147	46.3
1972	311	305	616	1,165	52.9
1973 est.	250	250	500	N.A.	N.A.

N.A.   Not available.

Source: North Carolina State Ports Authority.
          Estimates by Texasgulf, Inc.

Eleven tables will be used to analyze these commodities. Tables
3-6 to 3-11 deal with imports, exports and coastwise movements of
cargo over the State docks at Morehead City and Wilmington from 1960
through 1972. The last five tables (Tables 3-12 to 3-16) for 1960
and 1965 through 1971, refer to movements over both public and private
docks at Morehead City, Wilmington, Hampton Roads and Charleston. The
total amount of each commodity moving through these four ports is
listed as are the percentage shares accounted for by each of the four
ports. Tables 3-12 to 3-16 permit an analysis of trends in cargo among
the four ports; the commodities listed in these tables move primarily
over the State-owned docks. The principal commodities that move over
the private docks were discussed in Chapter 2 and in Section A of this
Chapter.

2. Fuel Oil and Asphalt

Fuel oil and asphalt are handled at Morehead City over the State-
owned docks. However, much larger quantities flow over the private
docks at Wilmington. In Table 3-6 fuel oil is listed as Bunker C oil
and is probably the same product listed as petroleum from 1960 through
1966. The quantity fluctuates from year to year with no discernible
trend. The quantity of asphalt imported through Morehead City has
declined since 1967, but it has been offset by coastwise shipments. In
Table 3-12, the total quantities of fuel oil and asphalt moving over
public and private docks at all four ports are listed along with the
shares accounted for by each of the ports. Most of the residual fuel
oil is handled at Hampton Roads, where it was 77 percent of the total
in 1971. The Morehead City share is less than one percent, while the
Wilmington share is presently about 10 or 11 percent, entirely over
privately-owned docks.

The quantities of petroleum handled at Wilmington are a function of
the economy of the area the Port serves and competition from interior
pipelines serving the area. The Morehead City movements are less
connected to general economic conditions because some of the oil is
shipped out to large industries or sold to ships. The asphalt at
Morehead City is used for manufacturing roofing products and is also

Table 3-6

Morehead City Imports, 1960-1972, Public Docks Only
(Thousand Short Tons)

	Bunker C Oil	Petroleum	Asphalt	Lumber	Logs	Plywood	Fish-meal	Tobacco	Iron & Steel	Other Imports	Total Imports
1960	-	183	92	2	-	-	2	-	1	2	282
1961	-	156	94	2	-	-	-	-	1	7	258
1962	-	89	82	1	-	-	-	-	1	3	176
1963	-	82	89	-	-	-	12	-	1	4	188
1964	-	72	100	-	-	-	9	-	-	1	182
1965	-	145	121	-	1	1	-	1	3	-	271
1966	18	103	119	-	4	-	-	-	2	-	247
1967	75	-	119	-	5a/	-	-	2c/	6	2	209
1968	70	-	92	3	1	2	18	9	1	1	197
1969	92	-	21	11	-	12b/	11	12	2	2	164
1970	136	-	2	22	-	-	12	5c/	-	-	177
1971	122	-	37	27	-	1b/	15	3c/	6	9d/	220
1972	130	-	44	31	-	2b/	34	17	-	4e/	262

a/ Logs and lumber.

b/ Includes veneers.

c/ These numbers differ slightly from those in Table 3-4 because a different data source was used.

d/ Includes 4 thousand tons of fruit and 4 thousand tons of cement.

e/ Includes 2 thousand tons of fruit.

Source: North Carolina State Ports Authority; RTI.

3-14

Table 3-7

Morehead City Exports, 1960-1972, Public Docks Only

(Thousand Short Tons)

	Phosphate and Fertilizer	Tobacco a/	Lumber	Logs	Wood-pulp	Paper and Paper Products	Fish-meal	Grain and Glycol c/	Misc. Bulk Items d/	Other Exports	Total
1960	-	36	3	-	-	-	13	44	4	1	101
1961	-	46	2	-	-	-	7	40	9	2	106
1962	-	49	4	-	-	-	8	29	7	-	97
1963	-	56	3	-	-	-	-	37	6	2	104
1964	-	61	5	-	-	-	6	42	2	2	118
1965	-	70	11 b/	-	-	-	-	48	16	3	149
1966	-	82	8 b/	-	-	-	-	38	1	2	131
1967	2	78	7 b/	-	-	1	-	28	1	2	119
1968	65	78	2	10	-	7	-	25	8	3	199
1969	319	86	4	6	-	1	-	-	1	2	437
1970	395	81	3	13	80	4	-	-	9	2	587
1971	332	70	1	3	56	11	-	-	-	-	473
1972	305	84	3	5	57	4	3	-	-	3	463

a/ These numbers differ slightly from those in Table 3-4 because a different data source was used.

b/ Includes logs.

c/ Grain exports ended in 1965.

d/ Includes dry milk, scrap, stone, rations, and sandbags.

Source: North Carolina State Ports Authority; RTI.

Table 3-8

Morehead City Coastwise and Military Shipments, 1960-1972, Public Docks Only
(Thousand Short Tons)

	Inbound				Outbound			Military	Grand Total
	Asphalt	Phosphate	Other	Total	Bunker C	Other	Total		
1960	-	-	-	-	-	-	-	125	125
1961	-	-	-	-	-	-	-	182	182
1962	-	-	-	-	-	-	-	148	148
1963	-	-	-	-	-	-	-	50	50
1964	-	-	-	-	-	-	-	119	119
1965	-	-	-	-	-	-	-	63	63
1966	-	-	-	-	-	-	-	42	42
1967	-	-	-	-	-	-	-	39	39
1968	17	103	-	120	26	4	30	31	181
1969	89	327	-	416	26	-	26	29	371
1970	127	379	4	510	36	-	36	18	564
1971	85	314	-	399	47	-	47	8	454
1972	69	311	2	382	48	2	50	8	440

Source: North Carolina State Ports Authority; RTI.

Table 3-9

Wilmington Imports, 1960-1972, Public Docks Only
(Thousand Short Tons)

	Steel	Plywood	Lumber	Urea	Tobacco[a]	Salt	Synthetic Fiber	Other Bulk[b]	Glass	Other Imports	Total Imports
1960	50	6	10	7	10	-	3	-	-	33	119
1961	44	5	4	6	7	-	2	-	-	24	92
1962	59	8	9	6	11	-	7	-	1	27	128
1963	70	14	9	5	6	7	16	-	-	36	163
1964	82	26	10	4	6	-	16	-	1	46	191
1965	105	25	19	-	7	12	11	-	1	46	226
1966	114	21	32	3	5	53	21	-	3	67	319
1967	120	17	48 [c]	21	9	37	14	6	7	62	341
1968	201	34	36	45	5	31	19	17	13	90	491
1969	173	45	44	51	3	11	20	-	14	70	431
1970	158	53	42	63	7	28	19	82	9	71	532
1971	182	77	55	40	6	20	17	4	7	88	496
1972	215	119	60 [d]	34	22	29	18	118	9	100	724

[a] These numbers differ slightly from those in Table 3-4 because a different data source was used.

[b] Includes xylene, glycol, iron ore, and other bulk commodities.

[c] Lumber and logs combined.

[d] Includes 3,000 tons of beechwood squares and 250 tons of logs.

Source: North Carolina State Ports Authority; RTI.

Table 3-10

Wilmington Exports, 1960-1972, Public Docks Only
(Thousand Short Tons)

	Metal Scrap	Wood-pulp	Paper and Paper Products	Tobacco a/	DMT	Boilers, Machinery, Equipment	Misc. Bulk Commodities b/	Other Exports	Total Exports
1960	134	58	1	16	-	4	7	7	227
1961	148	53	2	14	-	3	22	12	254
1962	58	44	3	13	-	5	13	9	145
1963	52	50	4	12	-	4	8	12	142
1964	70	67	6	11	-	5	26	11	196
1965	55	57	11	14	-	3	11	12	163
1966	58	64	9	12	-	4	43	12	202
1967	74	53	24	14	-	3	21	21	210
1968	67	38	28	17	-	4	35	16	215
1969	55	22	15	16	4	3	8	16	145
1970	59	23	12	12	30	4	2	18	160
1971	20	28	11	13	23	1	-	7	103
1972	14	27	4	59	18	2	-	20	144

a/These numbers differ slightly from those in Table 3-4 because a different data source was used.

b/Includes rations, military, tanks, sandbags, dry milk, gravel, and nitrates.

Source: North Carolina State Ports Authority; RTI.

Table 3-11

Wilmington Coastwise Shipments, 1960-1972, Public Docks Only
(Thousand Short Tons)

Year	Inbound							Outbound					Total, Coastwise Shipments
	Liquid Sulphur	Ethylene Glycol	Methanol	Xylene	Liquid Nitrogen	Caustic Soda and Other	Total	Methanol	Xylene	Prestressed Concrete	Other	Total	
1960	-	-	-	-	-	-	3	-	-	-	-	4	7
1961	-	-	-	-	-	-	-	-	-	4	-	4	4
1962	8	-	-	-	-	3	11	-	-	19	-	19	30
1963	35	-	-	-	-	7	42	-	-	31	-	31	73
1964	45	-	-	-	-	9	54	-	-	14	1	15	69
1965	53	-	-	-	-	6	59	-	-	31	-	31	90
1966	53	-	-	-	-	4	57	-	-	3	-	3	60
1967	51	-	-	-	-	9	60	-	-	10	1	11	71
1968	52	-	12	26	-	9	101	8	35	5	2	50	151
1969	40	-	34	95	-	11	180	26	88	11	3	128	308
1970	39	-	71	130	-	19	259	42	120	12	3	177	436
1971	47	58	63	147	14	18	347	49	151	6	61	269	616
1972	28	151	90	158	14	2	443	44	204	32	4	284	727

Source: North Carolina State Ports Authority; RTI.

Table 3-12

Tonnage and Percentage Shares of Selected Commodities
at Hampton Roads, Morehead City, Wilmington and Charleston
(Public and Private Docks)

	Commodity Flow (Thousand Short Tons)					Percentage Shares			
Year	Hampton Roads	Morehead City	Wilming-ton	Charles-ton	Total	Hampton Roads	Morehead City	Wilming-ton	Charles-ton
					Residual Fuel Oil				
1960	2697	57	187	965	3906	69.1	1.4	4.8	24.7
1965	2586	49	310	1071	4016	64.4	1.2	7.7	26.7
1966	2844	109	419	1113	4485	63.4	2.4	9.3	24.8
1967	3588	24	388	751	4751	75.5	0.5	8.2	15.8
1968	3348	45	554	1053	5000	67.0	0.9	11.1	21.0
1969	6203	113	818	1298	8432	73.6	1.3	9.7	15.4
1970	8836	134	1366	1828	12164	72.7	1.1	11.2	15.0
1971	10523	53	1463	1568	13607	77.3	0.4	10.8	11.5
					Asphalt, Tar, and Pitches				
1960	149	89	175	45	458	32.5	19.5	38.2	9.8
1965	134	76	301	351	862	15.5	8.9	34.9	40.7
1966	99	101	316	324	840	11.8	12.0	37.6	38.6
1967	116	93	247	463	919	12.7	10.1	26.9	50.3
1968	118	44	206	534	902	13.2	4.9	22.7	59.2
1969	86	82	122	398	688	12.5	12.0	17.7	57.8
1970	120	138	226	429	913	13.1	15.1	24.8	47.0
1971	134	84	256	422	896	37.9	9.3	28.6	47.2

Source: U.S. Department of the Army, Corps of Engineers, Waterborne Commerce of the United States: Part 1, Waterways and Harbors, Atlantic Coast. Vicksburg, Mississippi: Corps of Engineers, various years.

Table 3-13

Tonnage and Percentage Shares of Selected Commodities
at Hampton Roads, Morehead City, Wilmington and Charleston

(Public and Private Docks)

Year	Commodity Flow (Thousand Short Tons)					Percentage Shares			
	Hampton Roads	Morehead City	Wilmington	Charleston	Total	Hampton Roads	Morehead City	Wilmington	Charleston
Lumber									
1960	31	5	10	20	66	47.3	7.5	15.3	29.9
1965	67	4	15	13	99	67.8	3.7	15.0	13.5
1966	82	4	31	18	135	60.3	3.3	22.9	13.5
1967	64	4	44	19	131	49.3	2.9	33.5	14.3
1968	55	6	41	20	122	45.2	4.8	33.8	16.2
1969	38	15	43	17	113	33.7	13.3	38.1	14.9
1970	48	25	42	15	130	37.3	18.9	32.0	11.8
1971	47	20	60	25	152	30.6	13.3	39.6	16.5
Veneer, Plywood, Worked Wood									
1960	12	-	7	19	38	31.6	0.0	18.4	50.0
1965	18	2	23	52	95	19.0	2.1	24.2	54.7
1966	38	a/	23	97	158	24.0	0.0	14.6	61.4
1967	67	a/	16	16	99	67.6	0.0	16.2	16.2
1968	115	1	31	107	254	45.3	0.4	12.2	42.1
1969	125	12	47	102	286	43.7	4.2	16.4	35.7
1970	131	1	52	110	294	44.6	0.3	17.7	37.4
1971	148	1	60	145	354	41.8	0.3	16.9	41.0

a/ Less than 500 tons.

Source: U.S. Department of the Army, Corps of Engineers, Waterborne Commerce of the United States: Part 1, Waterways and Harbors, Atlantic Coast. Vicksburg, Mississippi: Corps of Engineers, various years.

Table 3-14

Tonnage and Percentage Shares of Selected Commodities
at Hampton Roads, Morehead City, Wilmington and Charleston
(Public and Private Docks)

	Commodity Flow (Thousand Short Tons)					Percentage Shares			
Year	Hampton Roads	Morehead City	Wilmington	Charleston	Total	Hampton Roads	Morehead City	Wilmington	Charleston
						Paper and Paperboard			
1960	92	a/	5	32	129	71.3	0.1	3.6	25.0
1965	114	a/	13	68	195	58.3	0.2	6.6	34.9
1966	124	a/	11	77	212	58.5	0.0	5.4	36.1
1967	115	1	22	81	219	52.7	0.4	9.9	37.0
1968	100	8	34	116	258	38.8	3.0	13.2	45.0
1969	83	2	22	115	222	37.7	0.7	9.8	51.8
1970	61	4	14	156	235	26.0	1.8	5.8	66.4
1971	62	10	24	201	297	20.8	3.4	8.2	67.6
						Pulp			
1960	44	-	59	158	261	16.7	0.0	22.6	60.7
1965	82	a/	50	68	200	40.9	0.0	25.1	34.0
1966	67	a/	67	62	196	34.2	0.1	34.4	31.4
1967	50	-	54	146	250	19.8	0.0	21.6	58.6
1968	47	-	38	158	243	19.3	0.0	15.7	65.0
1969	50	a/	22	87	159	31.3	0.3	13.7	54.7
1970	55	80	24	167	326	16.8	24.4	7.4	51.4
1971	52	57	28	128	265	19.8	21.4	10.5	48.3

a/Less than 500 tons.

Source: U.S. Department of the Army, Corps of Engineers, Waterborne Commerce of the United States: Part 1, Waterways and Harbors, Atlantic Coast. Vicksburg, Mississippi: Corps of Engineers, various years.

Table 3-15

Tonnage and Percentage Shares of Selected Commodities
at Hampton Roads, Morehead City, Wilmington and Charleston
(Public and Private Docks)

	Commodity Flow (Thousand Short Tons)					Percentage Shares			
Year	Hampton Roads	Morehead City	Wilmington	Charleston	Total	Hampton Roads	Morehead City	Wilmington	Charleston
					Basic Chemicals and Products				
1960	53	1	10	22	86	60.3	1.5	12.5	25.7
1965	23	3	96	29	151	15.1	2.1	63.8	19.0
1966	22	2	136	40	200	11.0	0.8	68.3	19.9
1967	58	3	149	26	236	24.7	1.2	63.3	10.8
1968	47	3	146	20	216	21.6	1.2	67.8	9.4
1969	59	a/	168	28	255	23.0	0.0	66.0	11.0
1970	63	a/	201	18	282	22.4	0.0	71.3	6.3
1971	84	a/	203	70	357	23.5	0.0	57.0	19.5
					Alcohols				
1960	4	19	2	0	25	15.7	77.0	7.3	0.0
1965	1	27	a/	2	30	3.2	88.9	0.1	7.8
1966	1	19	a/	7	26	2.1	71.6	0.1	26.2
1967	-	21	-	-	21	0.0	100.0	0.0	0.0
1968	-	14	25	-	39	0.0	34.8	65.2	0.0
1969	-	-	86	a/	87	0.0	0.0	99.5	0.5
1970	-	-	145	a/	146	0.0	0.0	99.7	0.3
1971	-	-	220	a/	220	0.0	0.0	100.0	0.0

a/ Less than 500 tons.

Source: U.S. Department of the Army, Corps of Engineers, Waterborne Commerce of the United States: Part 1, Waterways and Harbors, Atlantic Coast. Vicksburg, Mississippi: Corps of Engineers, various years.

Table 3-16

Tonnage and Percentage Shares of Selected Commodities
at Hampton Roads, Morehead City, Wilmington and Charleston
(Public and Private Docks)

Iron, Steel Shapes

Year	Commodity Flow (Thousand Short Tons)					Percentage Shares			
	Hampton Roads	Morehead City	Wilmington	Charleston	Total	Hampton Roads	Morehead City	Wilmington	Charleston
1960	1	–	a	0	1	90.5	0.0	5.4	4.1
1965	20	a/	20	90	130	15.5	0.0	15.1	69.4
1966	18	2	30	121	171	10.7	1.5	17.5	70.3
1967	10	6	26	117	159	6.7	3.7	16.2	73.4
1968	43	a/	38	154	235	18.0	0.3	16.3	65.4
1969	30	1	37	92	160	19.0	0.6	23.0	57.4
1970	16	–	29	41	86	18.8	0.0	33.8	47.4
1971	24	–	62	66	152	15.6	0.0	40.8	43.6

Iron, Steel Scrap

Year	Commodity Flow (Thousand Short Tons)					Percentage Shares			
	Hampton Roads	Morehead City	Wilmington	Charleston	Total	Hampton Roads	Morehead City	Wilmington	Charleston
1960	159	–	149	75	383	41.5	0.0	38.8	19.7
1965	100	–	55	28	183	54.4	0.0	30.2	15.4
1966	127	–	57	26	210	60.4	0.0	27.0	12.6
1967	90	–	74	34	198	45.3	0.0	37.5	17.2
1968	65	7	66	37	175	37.2	4.3	37.6	20.9
1969	160	–	55	36	251	63.8	0.0	21.8	14.4
1970	131	–	59	6	196	66.8	0.0	29.9	3.3
1971	97	–	102	4	203	47.8	0.0	50.1	2.1

a/ Less than 500 Tons.

Source: U.S. Department of the Army, Corps of Engineers, Waterborne Commerce of the United States:
Part 1, Waterways and Harbors, Atlantic Coast. Vicksburg, Mississippi: Corps of Engineers,
various years.

sold for street construction purposes. Although the quantity fluctuates from year to year at Morehead City, the effect on Port operations is negligible because very few people are required and the revenues generated are insignificant. Fuel oil and asphalt are handled by the Port under long-term contracts that were negotiated before the State assumed responsibility for the Ports. The SPA states that the contracted revenue is inadequate to cover costs associated with these products.

3. Lumber and Plywood

Lumber and plywood are important commodities at both Ports. Pulpwood logs are handled entirely by private docks and will not be discussed further, except to note that in total tonnage they exceed lumber and plywood, which are handled entirely at the State-owned docks at Morehead City and Wilmington.

Lumber imports have been growing recently at Morehead City as can be seen in Table 3-6. Most of this lumber is for construction purposes, although some of it is furniture-grade lumber for industry in the High Point area. According to the origin and destination study described in Chapter 4, the majority of construction lumber imports goes to the sections of the State nearest Morehead City such as Kinston, New Bern, Clinton, Reidsville, Rocky Mount, Durham and Greensboro. Some of the lumber does travel greater distances to South Carolina, Tennessee, Virginia and even New York. It is interesting to note that some of the veneers go to Newport News, Virginia. Much smaller quantities of lumber and logs are exported through Morehead City (see Table 3-7). Morehead City's share of the lumber market increased throughout the 1960's and now is about equal with Charleston's.

Lumber and plywood imports are significantly larger at Wilmington than at Morehead City, especially plywood (see Table 3-9). Most of the lumber and plywood is for construction purposes and is dependent on the economy of the Ports' tributary areas. However, some of Wilmington's lumber flows beyond the borders of the State. The Wilmington share of lumber imports has grown steadily and now is larger than that of Hampton Roads and Charleston. Some furniture lumber is also imported through Wilmington. North Carolina Ports control more than half the lumber imports moving through the four harbors.

As mentioned above, the quantity of lumber imports depends upon the construction industry, the state of the economy, and the ability of the North Carolina Ports to compete with ports in other states. The same comments hold true for plywood imports, although the total amount of imported plywood depends not only upon the domestic economy but also upon world market conditions for plywood. That is, with a slack world demand, West Coast plywood can be shipped by rail across the country, while in tighter market conditions, plywood will be imported from other parts of the world. In extreme cases, plywood may be exported from plants in the Southeast. The 1960's trend has been one of steadily increasing quantities of imported plywood through the four ports. The North Carolina share increased in the early 60's but has not shown any significant increase since 1966.

4. Woodpulp and Related Products

The southeastern area of the United States is an important producer of paper, pulp, and similar products made from wood. Substantial quantities of these products are exported through the ports of Hampton Roads, Morehead City, Wilmington, and Charleston. Woodpulp, which resembles thick, rough paper, is exported to other countries where it is made into various types of paper products. Exports of paper and pulp depend upon both domestic and international supply and demand.

Woodpulp exports through Morehead City originate mainly in New Bern, although some do come from the paper plant in Riegelwood near Wilmington. These exports began in 1970. Paperboard is also exported through Morehead City; this product originates in Plymouth, North Carolina. The Morehead City share of pulp moving through the four ports jumped from zero to almost 25 percent in 1970 but has fallen back slightly since then. The Morehead City share of paper and paperboard is still quite low at 3.4 percent in 1971 despite the rapid growth since 1960. Nevertheless, these products are important commodities at Morehead City in terms of their value and volume; woodpulp is the third ranking export after phosphate and tobacco.

Woodpulp was exported through the Port of Wilmington during the entire 1960-1971 period. The quantity exported has been declining since 1965 because of the rising domestic demand for woodpulp and the use of Morehead City as an alternative Port. Paper and paperboard products have also been declining at Wilmington for the same reasons. Both woodpulp and paper products originate in Riegelwood, North Carolina, which is quite close to Wilmington. Wilmington's share of pulp movements through the four ports has declined from 34 percent in 1966 to 10.5 percent in 1971. Its share of paper and paperboard products has also fallen, from a high of 13.2 percent in 1968 to 8.2 percent in 1971. The share dipped even lower in other years.

Charleston is the dominant port for both paper and pulp exports. The reason is the presence of more paper mills that export their products. The share and absolute amounts of paper and pulp moving through Hampton Roads has been declining because of competition from other ports and the increase in domestic demand.

5. Chemicals, Alcohol and DMT (Dimethyl Terethylate)

Chemicals, alcohol and DMT (dimethyl terethylate) have recently become very significant commodities at Wilmington. Some of these chemicals formerly moved through Morehead City but no longer do. Table 3-15 contains data on alcohols and basic chemicals and products. Morehead City was significant in the export of alcohol through 1968.

Chemicals and alcohols are imported, exported and move both directions in coastwise shipping through Wilmington, which is the dominant port for these items. Its share is between 60 and 70 percent of the four ports. Hampton Roads and Charleston each currently handle about 20 percent of basic chemicals.

The most significant chemicals handled at Wilmington are xylene, DMT, methanol, glycol, liquid nitrogen and liquid sulfur. Each of these will be briefly covered. Xylene is imported currently and also arrives coastwise. It is a solvent that is used in the textile industry, particularly synthetic textiles. Hercules uses xylene in its Wilmington plant to manufacture DMT, part of which is exported. Dupont also handles xylene and distributes it from the Wilmington Chemical Terminal. Methanol,

an alcohol, is another product that comes into the Wilmington area by coastwise shipping and is distributed throughout the State and as far away as Tennessee. It too is a solvent and used in the textile and photographic industries. Glycol is imported and also brought in coastwise. It is used as an antifreeze, solvent, and softener. Liquid nitrogen is imported for use in making fertilizer at both the W. R. Grace and the Swift Agriculture Chemicals plants in Wilmington. Another chemical is liquid sulfur which is used in making sulfuric acid and for treating phosphate mined at Aurora in Beaufort County.

6. Iron and Steel

Iron and steel are imported into Wilmington in the form of structural steel, steel sheets, fencing, wire and strapping, pipes and tubing, and nails in approximately equal quantities. As Table 3-9 indicates, iron and steel imports have risen at a steady rate since 1960, though there are some year to year fluctuations. The steel is used for many different purposes, especially construction which uses structural steel, nails, pipe, wiring, and fencing. Steel goes to many different parts of North Carolina as well as into other states. Many of the nails go to Fayetteville, where they are then distributed throughout the State. A large part of the steel sheets is used in Wilmington at Rollform Products, which processes them into end products. These end products are then exported or shipped to other parts of the State.

The Wilmington share of iron and steel imports has grown substantially since 1960 and now accounts for 41 percent of the total of the four ports. Charleston has 44 percent which represents a decrease from the level of 69 percent in 1965. Total imports of steel through the four ports has fluctuated since 1960, though there has been a decrease since the high in 1968. The Wilmington share of steel imports has increased because of the comparative advantage it has developed in handling steel products. The docks at Wilmington are spacious, the charges are lower than at Hampton Roads, adequate trucks are available, and good service has been developed through cooperation of steamship companies, brokers, truckers, and the SPA.

7. Iron and Steel Scrap

Iron and steel scrap was formerly an extremely important export through Wilmington; during the 1950's it was virtually the only export. The quantities have fallen off during the late 1960's, especially in the last two years because total American exports of scrap steel have declined. The quantity may pick up briefly when abandoned cars are collected as a result of new legislation. The Wilmington share of iron and steel scrap has been roughly constant during the 1960's, although there was an increase in 1971. This increase was due to movements over private docks in that year. Hampton Roads has been the dominant port of the four in terms of iron and steel scrap exports.

8. Other Specific Commodities

Fishmeal, a protein supplement for animal feed, is imported at Morehead City and a lesser amount is exported. The amount of fishmeal handled depends upon the supply of other products with which it competes. Although the quantities imported have been increasing, the outlook for the short run is not bright because of the world wide shortage of fishmeal and other protein supplements. The fishmeal is distributed from the warehouse in Morehead City to points throughout the State.

Some significant commodities imported at Wilmington include urea, salt, glass, and synthetic fibers. Urea is imported for the W. R. Grace Fertilizer Company in Wilmington and is used to make fertilizer. Some is sold to other companies that use it to make glue for plywood and other products. Imports have fallen off during the last few years, primarily due to shortages of the product.

Solar salt is imported in bulk for use by the highway department. Salt imports hit a peak in 1966 and have generally declined since then with the exception of 1972. The pickle industry, which is large in North Carolina, is using increasing amounts of solar salt because it is cheaper than other forms of salt and recently was declared safe for human consumption. Solar salt is produced from sea water by evaporation in shallow ponds using the rays of the sun.

Substantial imports of glass also come through Wilmington. A
peak was hit in 1969, and then imports declined through 1971. The
quantity picked up again in 1972 and should continue to increase
because a new company that will import large quantities of glass for
use in storm doors and windows has located near Wilmington.

Synthetic fibers have been imported in roughly constant quantities
since 1963. These fibers are used in the textile industry and will
continue to be imported in the foreseeable future because the domestic
supply cannot keep up with the demand.

Exports of boilers and other machinery are made through the Port
of Wilmington by several different companies. Babcock and Wilcox
exports boilers to all parts of the world from their Wilmington plant.
Their exports should continue to increase because of new orders for
large capacity boilers and because of the new gantry crane that can
handle them. Devaluation may stimulate the export of machinery from
the United States; Wilmington is in a good position to capture the
production from plants located in Charlotte and Durham such as Westing-
house and General Electric.

Prestressed concrete shapes are shipped out of Wilmington on
barges for coastwise destinations. These come from the F and G Company
located directly across the street from the SPA Office in Wilmington.
The volume depends upon the construction industry and the success of
this company in getting contracts.

9. All Other Commodities

The category 'all other commodities' includes all commodities
that are not specified in the above sections. This category includes
miscellaneous commodities that are handled in relatively small quantities.
In general, this category has been increasing at the Ports, which is
a good sign because it indicates an increased diversity of products
flowing through the Ports.

At Morehead City, this category has not been increasing to any
degree, which emphasizes the dependence of the Port at Morehead City upon
relatively few commodities. Morehead City imports in this category

were constant during the 1960 decade. The same is true of exports that fall into this category. The quantity fluctuates from one to three thousand tons for both imports and exports and is negligible.

All other commodities imported at Wilmington boomed during the 1960's. The quantity imported grew from 24,000 tons in 1961 to 100,000 tons in 1972. These commodities tend to be high value consumer goods. This category should continue to increase as the economy expands in North Carolina and, more importantly, as the frequency of ship service improves. Container service at Wilmington was significant to the increase of this category. There are also exports of this type of commodity at Wilmington, although the volume is only 20 percent of imports. In 1972 it was 20,000 tons, which was higher than in the preceding four years but about the same as in 1967; hence there has been no net change recently.

E. Remarks

In closing this chapter, it should be pointed out that all the analyses discussed to this point were performed with data on tonnage. More meaningful economic analyses can be performed with data on dollar values of cargo. Data in dollar terms would permit better projections to be made and result in improved planning. Coordination with the Bureaus of Census and Customs might be necessary to obtain data on cargo value.

Chapter 4

Beneficial Effects of the Ports

The economic benefits of the Ports are classified into three groups
in this chapter. The first group consists of the direct, indirect,
supplementary and secondary employment and income (see Section A).

- Direct effects result from firms and agencies that provide
  port-related services such as stevedore companies, steamship
  agents, the Coast Guard, banks and so forth.
- Indirect effects are found in firms that produce goods for
  export or process imported materials such as the phosphate mining
  operations or furniture factories that use imported lumber.
- Supplementary effects occur in firms connected to the indirectly
  affected firms by interindustry relationships such as trucking
  firms.
- Secondary effects result from the consumption expenditures of
  employees connected with the direct, indirect, and supplementary
  effects.

The second group of benefits is the savings on inland freight costs
to users of the Ports. These savings are based on the origins and desti-
nations of exports and imports and the costs of using ports in other states
(see Section B). The third group of benefits is the industrial location
effects. These benefits occur because of the influence of the Ports in
attracting new industry to the State. These benefits are described in
Section C. The employment and income benefits of the industrial location
effects overlap the indirect effects of section A of this chapter.

A. Employment and Income Effects

1. Introduction

The purpose of this section is to present estimates of employment
and income generated by port activities. The four categories of employ-
ment and income used to deal with these benefits are listed above. The
next section presents information on direct employment and income; the
third section contains the estimates of indirect, supplementary, and
secondary employment and income. Many of the indirect effects located
in the port counties are discussed in detail in section C.4 of this
Chapter.

2. Direct Employment and Income

Firms that provide port-related services were surveyed in order to determine the magnitude of the direct effects of the Ports on employment and income. Each firm was asked to list total employment and labor compensation (wages and salaries), the percentage that could be attributed to activities at the State owned docks, and the percentage attributed to total Port activities. The firms contacted consisted of all those listed in the Facts and Figures booklet published by the North Carolina State Ports Authority plus a few others recommended by the SPA. The firms include state and federal agencies, steamship agents, freight forwarders, stevedores, storage companies, trucking companies and railroads, banks, chandlers, shipyards, and such.

The results of the survey are listed in Table 4-1 for the two Ports separately and combined. The top row in each section refers to total employment in all firms that responded to the survey. Not all of the employment is associated with Port activities, however, as the next two rows indicate. The differences between the second and third rows is accounted for by the private docks and indicate how relatively insignificant they are in terms of direct employment and income.

The longshoremen are listed separately because they are not employees of the surveyed firms, although they work for the stevedore companies (which were surveyed) on a casual basis. The number of people who work as longshoremen is much larger than Table 4-1 indicates because many do not work full time. For example, according to the International Longshoremen's Association, the Wilmington local had 431 members who worked at least 700 hours in fiscal year 1972 and 107 who worked from 300 to 699 hours. An unknown number worked fewer than 300 hours. Some of the members of the Wilmington local worked at the Sunny Point Army Ammunition Facility during 1972 and 1973, but the amount of work at this facility is rapidly declining. At Morehead City, 123 longshoremen worked 550 hours or more and 32 worked from 300 to 549 hours. The Marine Corps uses its own personnel to handle military cargo, another reason why the number of people actually doing longshoremen work is greater than indicated.

The total direct employment and income effects from port activities were calculated as the sum of employment associated with SPA activities

Table 4-1

Direct Employment and Income in Port-Related Services, 1972

	Employment	Wages and Salaries
Wilmington		
All Firms Responding To Survey	1,742	$12,394,674
Associated with Total Port Activities	1,137	6,375,176
Associated with SPA Activities	1,005	5,616,410
Total Longshoremen[a]	189	2,510,827
Estimate for Nonrespondents	161	2,138,852
Total Associated with SPA Activities[b]	1,355	10,266,089
Morehead City		
All Firms Responding to Survey	344	2,052,871
Associated with Total Port Activities	241	1,533,867
Associated with SPA Activities	234	1,485,425
Total Longshoremen[a]	67	910,530
Estimate for Nonrespondents	14	190,260
Total Associated with SPA Activities[b]	315	2,586,215
Combined North Carolina Ports		
All Firms Responding to Survey	2,086	14,447,543
Associated with Total Port Activities	1,378	7,909,043
Associated with SPA Activities	1,239	7,101,835
Total Longshoremen[a]	256	3,421,357
Estimate for Nonrespondents	175	2,329,112
Total Associated with SPA Activities[b]	1,670	12,852,304

[a] Full-time equivalents (2,000 hours equals one employee).

[b] Total of rows associated with SPA activities, total longshoremen, and estimate for nonrespondents.

Source: Research Triangle Institute.

at the surveyed firms, all longshoremen, and an estimate for non-responding firms. The employment figures were estimated to be 1,355 at Wilmington, 320 at Morehead City and 1,800 for the two Ports combined. The corresponding income figures were $10.226, $2.586 and $12.852 million. Total employment in the Wilmington area (New Hanover County) was 37,120 in 1971. The 1,355 employees attributed to direct port-related services were 3.7 percent of the total. In the Morehead City area (Carteret County), the 315 employees were 3.3 percent of the 9,590 employed in 1971. The income for employment associated with SPA activities was 4.3 percent of total wages and salaries in New Hanover and Brunswick Counties and 5.6 percent in Carteret County.[1]

3. Other Employment and Income

Other employment and income effects were estimated using the input-output model of the North Carolina economy. This model was designed to accomplish tasks of this sort by tracing and measuring the total effects of production, consumption and exports.

The following steps were taken to estimate supplementary effects of export shipments. First, data about the commodities flowing through the State Ports were aggregated by the classification scheme of the input-output model. Then data from the sampling of dock orders were used to estimate the net amount of each commodity group originating or terminating in North Carolina. Next the model was used to calculate the employment needed to produce the commodities. Table 4-2 presents the results.

Table 4-2 shows that $167 million of personal income was generated in 1972 to produce goods for export or to process imported SPA commodities. Additionally, this income spawned secondary effects. These effects included additional retail sales and other such business activities. On a national level, these secondary benefits form a chain that is theoretically infinite in length, but in practice is limited by the fact that not all incremental income is spent. Even so, the sum of several rounds of spending would be large. When dealing with a small geographic area, however, economic leakages to other areas reduce

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[1] The total wages and salaries were for 1970.

Table 4-2

1972 Employment and Personal Income
Generated by Commodities Flowing Through State Ports

	Indirect Effects	Supplementary Effects	Combined Effects
Exports			
Employees	1,700	10,300	12,000
Annual Income	$11,100,000	$65,900,000	$77,000,000
Imports			
Employees	7,200	6,800	14,000
Annual Income	$46,400,000	$44,000,000	$90,400,000
Exports and Imports			
Employees	8,900	17,100	26,000
Annual Income	$57,500,000	$109,900,000	$167,400,000

Source: Research Triangle Institute.

the succeeding rounds of benefits within the area to insignificant
size in one or two rounds.

Because the major effects were mostly in the Coastal Region,
estimation of this additional supplementary effect was calculated
as if all the income were earned there. The input-output model was
used for this purpose, and it can treat each region separately for
some calculations, including this one. The results are as follows:

Total Estimated Income Effects

Income from Direct Effect	$ 12,900,000
Income from Indirect Effects	57,500,000
Income from Supplementary Effects	109,900,000
Secondary Income of Above Effects	28,800,000
TOTAL INCOME EFFECTS	$209,100,000

The supplementary and secondary effects are very substantial, amounting to
about $109.9 million annual personal income in secondary industry and $28.8
million personal income generated in the expenditure of the other types
of income. This is a total of more than $138 million, which is equiva-
lent to income earned in important manufacturing sectors such as tobacco.
The number of employees estimated for supplementary effects is equivalent
to the number employed directly in cigarette manufacturing.

The income associated with the Ports results in the direct payment
of income taxes by employees and corporations, the more indirect payment
of sales taxes and gasoline taxes, and the often hidden, but very real
payment of property taxes. The total income effects of the Ports in
1972 are estimated to result in a total of $21 million in State and
local taxes. This estimate was derived by using the North Carolina
Revenues and Expenditures model developed by RTI. This model is a set
of computerized equations that predict the main categories of State and
local government revenues and expenditures on the basis of variables
such as population, employment, and income.

B. Origins of Exports, Destination of Imports and Benefits to Shippers

1. Introduction

Many inland points rely upon the Ports for transportation services.
However, the benefits of the Ports to these points are not quite as
fixed as are the direct effects because inland points have alternate
ports that could be used if the North Carolina Ports did not exist.
Nevertheless, the identification of the inland points is important
for the purpose of providing information to the citizens of the State,
and also for calculating the savings on inland freight costs that
accrue to shippers when rates to the North Carolina Ports are lower
than rates to ports in other states.

The files of the State Ports Authority contain a document known
as a dock order for every shipment that moves through the ports. Data
from these dock orders were selected to ascertain the origin of exports
through the North Carolina Ports and the destination of imports. Because
there were more than 8,000 separate shipments through the North Carolina
Ports in 1972, only a sample could be reviewed. Shipments were classi-
fied by commodity groups and then sampled within groups according to
their dollar value. Dock orders for imports generally contained the
destination of the cargo. The information on the origin of exports was
obtained from steamship agents. Origins of exports and destinations of
imports were tabulated according to each of the 17 Multi-County Planning
Regions in North Carolina. Origins and destinations outside the State
were identified according to imports to or exports from South Carolina,
Virginia, and all other states combined.

Separate samples were drawn for exports and imports at Morehead
City and Wilmington. Within each of these categories three different
groupings were used: General, Tobacco, and Specified.

- General Group refers to all commodities except for tobacco
  and those in the Specified group.
- Tobacco refers to all tobacco shipments moving through the
  ports. Tobacco was sampled at a different rate than commo-
  dities in the General group.
- Specified Group refer to those commodities whose origins or
  destinations were known with certainty, and thus are actual
  counts. All coastwise shipping is in this category. The

major commodities are bulk chemicals such as methanol, xylene, and DMT, prestressed concrete, woodpulp and linerboard, asphalt, Bunker C oil, phosphate, and fishmeal.

As mentioned above, the sampling was undertaken on the basis of the dollar value of the imports and exports. Dollar values were felt to be more significant than the tonnage figures. Tonnage figures from the files of the State Port Authority were converted to dollar values on the basis of information from the Bureau of Customs. That is, the reports of the Wilmington District Office of the Customs Bureau were used to calculate per unit values of the commodities moving through the ports. The value of items that moved coastwise were obtained from the companies involved when the commodity did not also move in foreign trade. The values assigned to commodities are f.o.b. prices, that is, freight on board at the point of embarkation. This procedure means that the value of imports is low because they do not include the cost of ocean transportation and duty. The price to the consignee and value to the economy are higher by these amounts.

2. Origins and Destination, Wilmington

Table 4-3 contains estimates of the value of commodities flowing through the Port of Wilmington in 1972. The total value of commodities flowing through the Port at Wilmington in 1972 was $389,207,000, of which $283,034,000 were imports and $102,707,000 were exports. The value per ton was greater for exports than for imports.

Both imports and exports are divided into the three categories described above. Furthermore, 20 different locations are identified for each according to the 17 Multi-County Planning Regions in North Carolina, Virginia, South Carolina, and all other states combined. Exhibit 4-1 identifies the Multi-County Planning Regions. At Wilmington there is one other category called "stored" that refers to goods that are currently in long term storage and whose destination is not yet known.

Of the general category of imports, Region F (Charlotte) received the largest amount with $41 million (about one-fifth of the total). The second highest was Region O (Wilmington), followed by Region G, which contains Winston-Salem, Greensboro, and High Point. Not all the imports
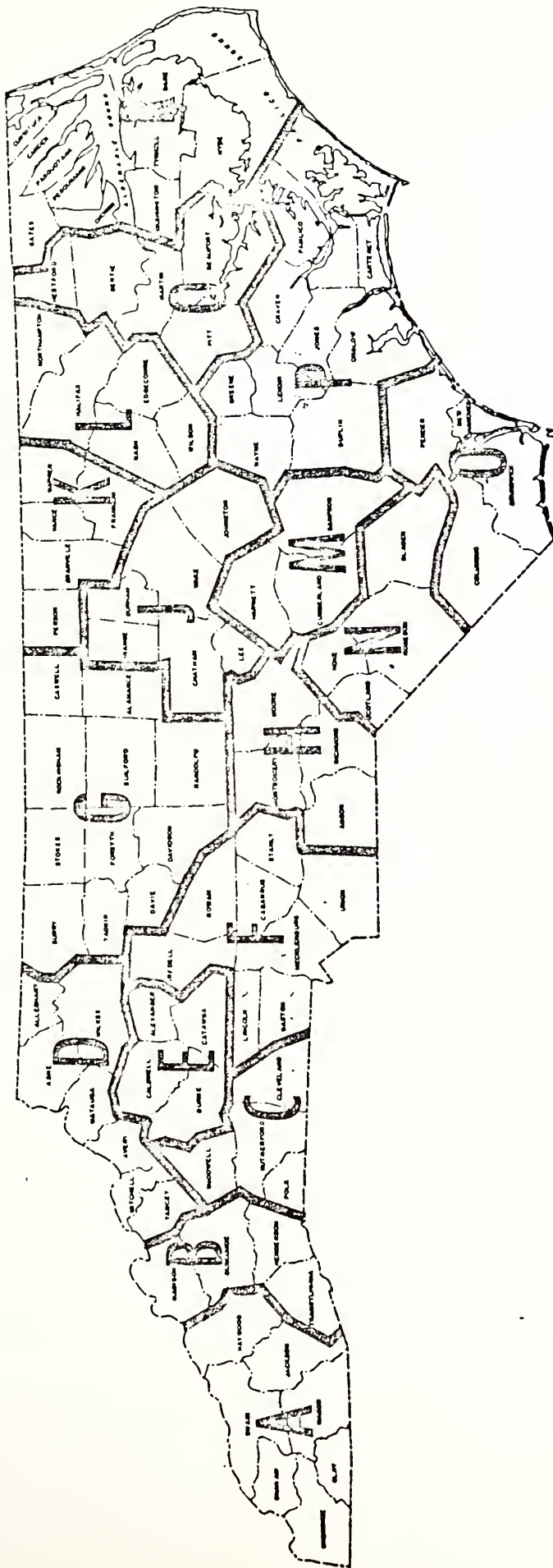
Exhibit 4-1. North Carolina Multi-County Planning Regions.

Table 4-3

Value of Cargo by Destinations of Imports and Origins of Exports Through State Port at Wilmington, 1972
(Thousand Dollars)

Origin or Destination	Imports General[a] Group	Tobacco	Specified Group	Exports General Group	Tobacco	Specified Group	In Transit	Total
MCPR A	–	–	–	–	–	–	–	–
MCPR B	–	–	–	–	–	–	–	–
MCPR C	$ 592	–	–	–	–	–	–	$ 592
MCPR D	5,377	–	–	–	–	–	–	5,377
MCPR E	2,861	–	–	–	–	–	–	2,861
MCPR F	41,638	–	$ 18	$ 3,040	–	–	–	44,696
MCPR G	27,331	$ 5,870	–	1,814	$ 1,508	$ 8	–	36,531
MCPR H	592	–	–	–	–	–	–	592
MCPR J	8,633	14,676	–	3,432	6,034	–	–	32,775
MCPR K	4,933	–	–	1,961	–	–	–	6,894
MCPR L	12,827	–	–	–	26,700	–	–	39,527
MCPR M	11,692	–	–	–	–	–	–	11,692
MCPR N	3,305	–	–	–	453	–	–	3,758
MCPR O	36,507	–	44,227	3,040	–	21,191	–	104,965
MCPR P	4,341	–	–	1,471	9,805	–	–	15,617
MCPR Q	641	–	585	981	7,542	–	–	9,749
MCPR R	99	–	–	–	–	–	–	99
Virginia	7,400	–	–	2,942	1,508	3,853	–	15,703
South Carolina	26,986	–	95	1,961	754	484	–	30,280
Other States	20,819	–	–	1,912	–	310	–	23,041
Stored	987	–	–	–	–	–	$ 3,466	–4,453
Total[b]	$217,563	$20,546	$44,925	$22,554	$54,306	$25,847	$3,466	$389,207

[a] Commodities were grouped to facilitate sampling of shipment data; see the text for descriptions of the groups.

[b] Individual items may not add to total because of rounding.

Source: Research Triangle Institute.

to each of these Regions stayed in the Region. For example, wholesale operations were conducted by various firms in these Regions and, where possible, these wholesale functions were identified. For example, in Region O (Wilmington), at least 42 percent of general imports were for distribution wholesale from Wilmington including rugs, whiskey and items for large chain stores. At least 20 percent of imports to the Charlotte Region are for wider distribution, particularly plywood. In Region M, which includes Fayetteville, at least 57 percent of imports are intended for further distribution; nails are the most important commodity in this group.

A significant percentage of general imports through Wilmington flowed to other states. A total of $139 million or approximately 1/4 of the general imports went to other states with nearly half of this amount going to South Carolina.

About 29 percent of the tobacco that was imported through Wilmington went to manufacturers in Region G (Winston-Salem) and 71 percent to Region J (Durham).

The great majority of imports of the specified items category went to Region O for use there or for further distribution. The various chemicals such as methanol, glycol, liquid sulfur, paraxylene, urea, and nitrogen solution are included in this category as is iron ore. Some of these commodities are destined for use in Wilmington, while others are distributed widely. Methanol and glycol are widely used in the textile industry as well as for antifreeze. Some of the liquid sulfur was for the Texasgulf fertilizer operations. Iron ore was shipped by barge to South Carolina after being unloaded in Wilmington.

The value of general exports through Wilmington was $22 million, which was 10 percent of general imports. The principal originating points were Regions F, J, and O and Virginia. Tobacco exports were two and a half times greater than the general exports. The largest originating point is Region L, which includes Rocky Mount and Wilson. Kinston in Region P and Farmville in Region Q are also important originating points for

tobacco exports. The specified exports, which include coastwise shipping, originated primarily in Region O, and have about the same value as general exports. Some of the important commodities were DMT produced by Hercules, nuclear fuel elements produced in Wilmington by General Electric, and woodpulp from Riegelwood produced by Federal Paper Company. Some important coastwise outbound commodities were methanol and xylene, concrete pipes from South Carolina, and prestressed concrete from Wilmington. Modular homes from Virginia have also been exported through Wilmington.

When all the imports and exports were added together, the largest quantity originated in or was destined for Region O, the Wilmington area. Probably half of the total consists of items for further distribution to other parts of the State and outside the State according to the sample of dock orders. The actual value that originated in Wilmington or whose final destination was the Wilmington area may be about the same as the value of the goods going to Charlotte (Region F), or Greensboro (Region G), even though these regions were farther away.

3. <u>Origins and Destinations, Morehead City</u>

Table 4-4 refers to the value of cargo moving through the Port of Morehead City over the State-owned Ocean Terminal. The total value of cargo moving through this Port in 1972 was $147.7 million, of which imports were approximately $37 million, exports were $96 million, and the military cargo was estimated at about $15 million. General imports in Morehead City were very small compared with Wilmington-- $4.6 million versus $217.6 million. According to the sampling results, approximately 70 percent of these imports were destined to other states. Some of the commodities that went to other states include lumber, bananas, and luggage. It is possible that the amount of imports going to other states was overstated because the small size of the sample at Morehead City reduced the reliability of the results. Within North Carolina, the most significant destination of the general imports was Region P, where Morehead City is located; Regions E and G were next in importance. Both of these Regions are centers of the furniture industry, which now imports substantial quantities of lumber through Morehead City. Most of the other general imports destined for North Carolina points consist of

Table 4-4

Value of Cargo by Destinations of Imports and Origins of
Exports Through State Port at Morehead City, 1972
(Thousand Dollars)

Origin or Destination	Imports General[a] Group	Tobacco	Specified Group	Exports General Group	Tobacco	Specified Group	Military	Total
MCPR A	-	-	-	-	-	-	-	-
MCPR B	$ 47	-	-	-	-	-	-	$ 47
MCPR C	93	-	-	-	-	-	-	93
MCPR D	-	-	--	-	-	-	-	-
MCPR E	419	-	-	-	-	-	-	419
MCPR F	-	-	-	-	-	-	-	-
MCPR G	140	-	-	$ 506	$ 3,083	-	-	3,729
MCPR H	-	-	-	-	-	-	-	-
MCPR J	93	-	-	-	3,083	-	-	3,176
MCPR K	-	-	-	-	15,413	-	-	15,413
MCPR L	-	-	-	-	20,037	-	-	20,037
MCPR M	93	-	-	-	-	-	-	93
MCPR N	-	-	-	-	-	-	-	-
MCPR O	-	-	-	-	-	$ 60	-	60
MCPR P	652	$ 1,720	$16,819	253	1,541	7,429	$15,706	44,120
MCPR Q	-	172	-	253	21,578	8,227	-	30,230
MCPR R	-	-	-	-	-	536	-	536
Virginia	606	13,769	-	-	9,248	-	-	23,623
South Carolina	186	-	-	-	-	-	-	186
Other States	2,329	-	-	506	3,083	40	-	5,958
Total[b]	$4,658	$15,662	$16,819	$1,519	$77,065	$16,293	$15,706	$147,722

[a] Commodities were grouped to facilitate sampling of shipment data; see the text for descriptions of the groups.

[b] Individual items may not add to total because of rounding.

Source: Research Triangle Institute.

construction lumber. Substantial amounts of tobacco were imported through Morehead City with most of it destined for Richmond, Virginia. Some of the tobacco also went to Kinston, North Carolina in Region P.

The specified group of imports was quite large in dollar terms. The largest component, approximately half, was accounted for by coastwise inbound shipments of phosphate from the Texasgulf operation in Region Q. The remainder consisted of imported fishmeal, Bunker C fuel oil, and asphalt. These three items were destined for companies located in Morehead City.

General exports from Morehead City were relatively small in value and originated in Regions G, P, Q and other states. Because of the small size of the sample and the large sampling error, the results were not very reliable. Tobacco was the primary export in dollar terms and originated in Regions K, L, Q, and Virginia. The tobacco that arrived at Morehead City was shipped from large warehouses in these regions, but may have been grown in other parts of the Southeast. Tobacco accounted for $77 million out of total exports of $95 million, or approximately 81 percent of the value of all exports. Without tobacco, the value of shipments through Morehead City would be a small fraction of the present value, even though tonnage would not be greatly affected.

The specified category of exports consisted of phosphate and fertilizer from Aurora (Region P), woodpulp from New Bern (Region P) and Riegelwood (Region O), bone meal from Minnesota, fishmeal from Morehead City (Region O), and liner board from Plymouth (Region R) and Riegelwood (Region O). Phosphate accounted for less than 10 percent of the value of exports but 60 percent of the tonnage.

The military shipments include both imports and exports from the Marine base at Camp Lejeune in Jacksonville.

4. Savings to Shippers

The results of the origin and destination study were used to calculate benefits to shippers who use the North Carolina Ports. Only the savings on inland freight costs were readily quantifiable, although other savings may result from the lack of congestion, delays and pilferage at the docks according to officials in the shipping industry.

Tonnage figures were necessary to calculate freight costs because freight rates are typically quoted in terms of weight. The tobacco sample and specified categories could readily be converted to tons because the same price was used for all shipments. The total weight of the general sample was known and was prorated to all the entries on the basis of their value. Thus, the weights listed in Tables 4-5 and 4-6 (general sample) were proportional to the dollar values in Tables 4-3 and 4-4. The tobacco tonnages were also proportional to the value of tobacco in each origin or destination because all tobacco was valued at the same price per ton. Total tonnage in the specified category was not proportional to total value because each commodity was treated separately.

The freight costs were calculated for the general sample using the lowest possible class rates from a significant place within the Region (see Appendix B). The lack of detail in the data did not permit the use of specific rates so the savings may be overestimated. Both truck and rail rates were used because the means of shipment to each Region were unknown. Specific rates were used for the tobacco sample and for woodpulp. Other specified items were not included because they probably would not be produced or consumed in the Morehead City and Wilmington areas if the Ports did not exist.

The savings were determined by calculating the freight costs from the region of origin or destination to the Port used and then to the nearest out-of-state port; the difference was the savings. Tables 4-7 and 4-8 contain the estimates of savings at Wilmington and Morehead City by MCPR for both motor carriers and rail rates.

Total savings on inland freight costs because of the Port of Wilmington probably ranged between $2.8 and $3.8 million in 1972; this range depends on whether motor carrier or rail rates were used. These savings may be high because some of the imports that go to Wilmington as a wholesale distribution point would be shipped to another distribution point closer to the out-of-state port chosen. The use of specific rates would likely result in lower estimates. Nevertheless, the savings would still be impressive.

Table 4-5

Tonnages of Commodities by Destinations of Imports and Origins of
Exports Through State Port at Wilmington, 1972
(Thousand Short Tons)

Origin or Destination	Imports General[a] Group	Imports Tobacco	Imports Specified Group	Exports General Group	Exports Tobacco	Exports Specified Group	In Transit	Total
MCPR A	-	-	-	-	-	-	-	-
MCPR B	-	-	-	-	-	-	-	-
MCPR C	1.5	-	-	-	-	-	-	1.5
MCPR D	13.6	-	-	-	-	-	-	13.6
MCPR E	7.2	-	-	-	-	-	-	7.2
MCPR F	105.1	-	.3	5.1	-	-	-	110.5
MCPR G	69.0	6.4	-	3.0	1.7	.2	-	80.3
MCPR H	1.5	-	-	-	-	-	-	1.5
MCPR J	21.8	16.1	-	5.8	6.6	-	-	50.3
MCPR K	12.5	-	-	3.3	-	-	-	15.8
MCPR L	32.4	-	-	-	29.2	-	-	61.6
MCPR M	29.5	-	-	-	-	-	-	29.5
MCPR N	8.3	-	-	-	.5	-	-	8.8
MCPR O	92.2	-	561.1	5.1	-	293.8	-	952.2
MCPR P	11.0	-	-	2.5	10.7	-	-	24.2
MCPR Q	1.6	-	28.4	1.6	8.2	-	-	39.8
MCPR R	.2	-	-	-	-	-	-	.2
Virginia	18.7	-	-	4.9	1.7	3.2	-	28.5
South Carolina	68.1	-	.9	3.3	.8	32.2	-	105.3
Other States	52.6	-	-	3.2	-	.7	-	56.5
Stored	2.5	-	-	-	-	-	4.4	6.9
Total[b]	549.4	22.5	590.7	37.8	59.4	330.1	4.4	1,594.3

[a] Commodities were grouped to facilitate sampling of shipment data; see the text for descriptions of the groups.

[b] Individual items may not add to total because of rounding.

Source: Research Triangle Institute.

Table 4-6

Tonnages of Commodities by Destinations of Imports and Origins of
Exports Through State Port at Morehead City, 1972
(Thousand Short Tons)

| Origin or Destination | Imports | | | Exports | | | | |
	General[a] Group	Tobacco	Specified Group	General Group	Tobacco	Specified Group	Military	Total
MCPR A	-	-	-	-	-	-	-	-
MCPR B	.4	-	-	-	-	-	-	.4
MCPR C	.7	-	-	-	-	-	-	.7
MCPR D	-	-	-	-	-	-	-	-
MCPR E	3.3	-	-	-	-	-	-	3.3
MCPR F	-	-	-	-	-	-	-	-
MCPR G	1.1	-	-	3.1	3.4	-	-	7.6
MCPR H	-	-	-	-	-	-	-	-
MCPR J	.7	-	-	-	3.4	-	-	4.1
MCPR K	-	-	-	-	16.8	-	-	16.8
MCPR L	-	-	-	-	21.9	-	-	21.9
MCPR M	.7	-	-	-	-	-	-	.7
MCPR N	-	-	-	-	-	-	-	-
MCPR O	-	-	-	-	-	.4	-	.4
MCPR P	5.2	1.9	589.5	1.6	1.7	110.2	8.2	718.3
MCPR Q	-	.2	-	1.6	23.6	304.7	-	330.1
MCPR R	-	-	-	-	-	3.6	-	3.6
Virginia	4.8	15.0	-	-	10.1	-	-	29.9
South Carolina	1.5	-	-	-	-	-	-	1.5
Other States	18.6	-	-	3.1	3.4	.3	-	25.4
Total[b]	37.2	17.1	589.5	9.4	84.2	419.2	8.2	1,164.8

[a] Commodities were grouped to facilitate sampling of shipment data; see the text for descriptions of the groups.

[b] Individual items may not add to total because of rounding.

Source: Research Triangle Institute.

Table 4-7

Inland Freight Savings to Users of the State Port at Wilmington, 1972
(Thousand Dollars)

Origin or Destination		For Motor Carrier				For Rail			
		General	Tobacco	Woodpulp	Total	General	Tobacco	Woodpulp	Total
MCPR	A	a/	a/	$ 0	$ 0	a/	a/	$ 0	$ 0
MCPR	B	a/	a/	0	0	a/	a/	0	0
MCPR	C	0	a/	0	0	$ 0	a/	0	0
MCPR	D	$ 24	a/	0	24	30	a/	0	30
MCPR	E	6	a/	0	6	4	a/	0	4
MCPR	F	132	a/	0	132	176	a/	0	176
MCPR	G	115	b/	0	115	230	b/	0	230
MCPR	H	3	a/	0	3	6	a/	0	6
MCPR	J	55	b/	0	55	72	b/	0	72
MCPR	K	b/	a/	0	0	b/	a/	0	0
MCPR	L	b/	$18	0	18	b/	$47	0	47
MCPR	M	171	a/	0	171	227	a/	0	227
MCPR	N	48	0	0	48	63	1	0	64
MCPR	O	2,024	a/	172 c/	2,196	2763	a/	172	2,935
MCPR	P	30	6	0	36	38	19	0	57
MCPR	Q	b/	b/	0	0	b/	b/	0	0
MCPR	R	b/	a/	0	0	b/	a/	0	0
TOTAL		$2,610	$24	$172	$2,805 d/	$3,609	$67	$172	$ 3,848 d/

a/ No entries in sample.

b/ Negative saving; freight rate for Wilmington is greater than to an out-of-state port.

c/ These savings are based on rail rates because very little woodpulp travels by truck.

d/ These savings do not include the special bulk items originating or destined for Wilmington because they probably would not be produced in the area if the Port were not there.

Source: Research Triangle Institute.

Table 4-8

Inland Freight Savings to Users of the State Port at Morehead City, 1972
(Thousand Dollars)

Origin or Destination	For Motor Carrier				For Rail			
	General	Tobacco	Woodpulp	Total	General	Tobacco	Woodpulp	Total
MCPR A	a/	a/	$ 0	$ 0	a/	a/	$ 0	$ 0
MCPR B	b/	a/	0	0	b/	a/	0	0
MCPR C	b/	a/	0	0	b/	a/	0	0
MCPR D	a/	a/	0	0	a/	a/	0	0
MCPR E	b/	a/	0	0	b/	a/	0	0
MCPR F	a/	a/	0	0	a/	a/	0	0
MCPR G	$ 0	b/	0	0	$ 0	$ 0	0	0
MCPR H	a/	a/	0	0	a/	a/	0	0
MCPR J	1	b/	0	1	2	6	0	8
MCPR K	a/	$0	0	0	a/	0	0	0
MCPR L	a/	0	0	0	a/	39	0	39
MCPR M	2	a/	0	2	1	a/	0	1
MCPR N	a/	a/	0	0	a/	a/	0	0
MCPR O	a/	a/	0	0	a/	a/	0	0
MCPR P	35	1	93 c/	130	48	4	93	144
MCPR Q	4	0	0	4	5	b/	0	5
MCPR R	a/	a/	0	0	a/	a/	0	0
Total	$43	$1	$93	$137	$56	$49	$93	$198

a/ No entries in sample.

b/ Negative saving; freight rate for Morehead City is greater than to an out-of-state port.

c/ These savings are based on rail rates because very little woodpulp travels by truck.

d/ These savings do not include special bulk items because they probably would not exist without the Port.

Source: Research Triangle Institute.

The estimate of 1972 savings to users of the Morehead City Port were between $137,000 and $198,000 depending on inland shipping mode. The estimate is conservative because the percentage of imports going to other states probably was overestimated and some commodities were not included in the estimate as explained below. The number of sampling units in the general items sample was very small because of the low value of imports. Some of the sampled items which were going to other states did not appear representative of total shipments, yet could not be changed because of the sampling design. Another reason for under-estimation of savings was the exclusion of specified items such as fishmeal, Bunker C fuel oil and asphalt that are distributed from Morehead City. If other ports were to be used distribution points for these commodities, inland freight costs would certainly increase. The export of phosphate through Morehead City rather than Norfolk or Wilmington results in substantial savings on barge transportation costs. Estimates of these costs would require information about internal company operations because Texasgulf provides its own inland transportation.

The total savings at each port were calculated by summing all the positive savings but not subtracting the "negative savings." Negative savings occurred when the freight rate from the inland point to the nearest North Carolina Port was higher than the rate to a competing port. The reason for following this procedure is the assumption that people minimize costs and/or maximize profits. That is, common carrier rates may not reflect the true cost of travel to various ports when privately owned trucks are used. On the other hand, savings at the port on handling or other charges might offset the difference in inland freight costs. The amount of "negative savings" was between $84,000 and $238,000 at Wilmington and between $13,000 and $175,000 at Morehead City.

C. Industrial Location Effects

1. Introduction

Ports are beneficial to the economy of the State because they enable in-State firms to move their goods more cheaply than they could if they had to use out-of-state ports. Firms often locate close to ports in order to minimize their inland transportation costs, thus increasing

employment in the area. The objective of this section is to present an estimate of the effects of the Ports on the location decisions of firms in North Carolina.

Many different factors influence the decisions of firms to locate in a particular area. The general principle is that firms locate in places where they can maximize their profits. An alternative statement is that firms minimize their costs in such a way that they can maximize profits. Many factors go into achieving overall cost minimization. For example, the cost and efficiency of labor is an important consideration, especially in labor intensive industries. Other important factors are accessibility of raw materials and markets. Accessibility of materials is a function of distance to the originating point of the materials and the availability of various forms of transportation services. Additional significant factors are taxes, the cost of land, the supply and cost of utilities, and the amenities of the area.

The significance of ports lies in their ability to facilitate waterborne transportation--the least costly transportation mode. Most firms that depend on imported materials or on low value materials that travel by water tend to locate near ports or on waterways; firms that produce low value products also will locate on waterways if practical.

As noted, many factors influence industrial location. The problem in this study was isolating those industrial location decisions which can be attributed to the Ports. A small number of firms depend heavily on the Ports and would not have located in North Carolina if the State Ports did not exist (see section C. 4 of this chapter). In addition, there are firms for which the Ports were very important in their location decisions, but not the sole, overriding factor. Benefits to these firms which can be attributed to the Ports are measured in terms of the percentage of production exported and/or percentage of inputs imported.

Three different approaches were used to identify and measure the industrial location effects of the Ports. The first was to contact all manufacturing firms that were established in North Carolina in 1960 or later and which either import, export, or do both. This approach used a mail survey that was based on the inventory of manufacturing firms maintained by the North Carolina Department of Natural and Economic

Resources (DNER). The second approach was to analyze data about these firms contained in the inventory to infer their dependence on exports and imports. The location of these firms was analyzed and compared to other firms established since 1960 which do not import or export. The third approach was to ask a number of experts in industrial location for their opinions about the effects of the Ports.

2.   Survey of Manufacturing Firms

   a.   Approach

   A mail survey of manufacturing firms was conducted to ascertain the influence of the Ports on the decision of firms to locate in North Carolina. The mailing covered all plants that have been established in North Carolina since 1960 and that import or export goods. The year 1960 was chosen because Port operations expanded rapidly after that year. Also, information from more recently established plants was thought to be more reliable than information from older plants. Although the influence of the Ports is more significant in the eastern part of the State, the entire State was surveyed.

   Consequently, questionnaires were sent to 338 plants listed by the North Carolina Department of Natural and Economic Resources as being established in North Carolina since 1960 and engaged in foreign trade. The first mailing and one follow-up brought returns from 291 establishments, a response rate of 86.1 percent. A response rate of this magnitude certainly seems adequate to give reliable information. The rate of response also suggests that industry is very interested in the subject.

   A short questionnaire was used; only two questions were included. The first asked the respondent to evaluate the importance of each of five modes of transportation to the plant's location decision. The five modes were motor freight, rail freight, air freight, inland water freight, and ocean freight. The respondent could mark one of five choices for each mode: critically significant; very significant; significant, slightly significant; not significant. The second question asked the respondent to indicate the ports (by percentage of weight) through which his supplies or products flowed.

This question helped to determine whether ocean transportation was significant either because of the North Carolina Ports, or ports in other states. A copy of the questionnaire is included as Exhibit 4-2.

b.   Effects of the Ports on Location Decisions

Table 4-9 contains all the information derived from the mail survey about the significance of ocean freight to location decisions. Of 284 usable responses, 22 indicated that ocean freight was "critically significant" to their decisions to locate in North Carolina, 13 firms said that the ocean freight was "very significant", while 29 said it was "significant." The remaining firms said that ocean freight was "slightly significant" or "not significant."

At first glance it might seem that ocean freight has not been particularly important to economic development in North Carolina. Seventy-seven percent of the firms responding said that ocean freight was slightly significant or not significant to their decision to locate. Moreover, the only firms surveyed were those which either import or export, giving a heavy bias toward ocean freight. Further consideration, however, indicates that the contribution of the Ports to economic development in North Carolina may be quite substantial. As mentioned in the first section, many factors contribute to the choice of location; ocean transportation is only one of them. However, the fact that 35 establishments said that ocean freight was critically or very significant to their location decision indicates that North Carolina probably would not have obtained these firms if it did not have the Ports. These firms would have located in other states that did have ports.

The responses were classified by the three principal geographic regions of the state; Mountain, Piedmont, and Coastal Regions. The distribution of types of responses reflects this geographical division. In the Coastal Region, 18 out of 82 firms that responded (22 percent) said that the Ports were critically significant or very significant to their location decisions, while 15 out of 152 firms in the Piedmont and only two out of 50 in the Mountain Region made this claim. Thus, the Ports were more than twice as significant for economic development in the Coastal Region than in the Piedmont and more than five times greater than in the Mountain Region.

4-23

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION AND HIGHWAY SAFETY
RALEIGH 27611

JAMES E. HOLSHOUSER, JR.
GOVERNOR

WM JOHN CAMERON
ASSISTANT SECRETARY

TRANSPORTATION ASSESSMENT SURVEY

BRUCE A. LENTZ
SECRETARY

The Research Triangle Institute is conducting a study for the North Carolina Department of Transportation. One part of this study is to assess the significance of transportation in the selection of plant locations. We request your assistance in this important survey.

Please answer the questions below and return this letter in the enclosed envelope. Your cooperation will be appreciated. For additional information call Dr. Paul Mulligan at (919) 549-8311.

Please check the appropriate square that indicates the importance of transportation to your decision to locate your plant in this county.

	Critically Significant	Very Significant	Significant	Slightly Significant	Not Significant
Motor Freight					
Rail Freight					
Air Freight					
Inland Water Freight					
Ocean Freight					

If ocean freight has any significance to your firm, please indicate the ports through which your supplies and/or products flow.

	Approximate Percentage (by weight)
North Carolina Ports	_____ %
Virginia Ports	_____ %
South Carolina Ports	_____ %
All Other Ports	_____ %

_____
Name and Position of Person Supplying Information

Exhibit 4-2. Questionnaire for Transportation Assessment Survey

Table 4-9

Significance of Ocean Transportation to the Location
Decisions of Manufacturing Firms Established in
North Carolina Since 1960

Region	Critically Significant	Very Significant	Significant	Slightly Significant	Not Significant	Total
			Number of Establishments Responding			
State	22	13	29	39	181	284
Mountain Region[a]	1	1	6	4	38	50
Piedmont	10	5	18	24	95	152
Coastal	11	7	5	11	48	82
MCPR A	1	0	0	0	6	7
MCPR B	0	1	3	3	11	18
MCPR C	0	0	3	0	4	7
MCPR D	0	0	0	0	4	4
MCPR E	0	0	0	1	13	14
MCPR F	5	2	7	12	32	58
MCPR G	1	3	8	8	38	58
MCPR H	1	0	0	1	3	5
MCPR J	2	0	2	4	19	27
MCPR K	1	0	2	0	2	5
MCPR L	1	2	1	3	13	20
MCPR M	0	1	1	0	5	7
MCPR N	2	1	1	2	9	15
MCPR O	3	2	0	3	6	14
MCPR P	2	0	0	2	9	13
MCPR Q	3	1	2	0	5	11
MCPR R	0	0	0	1	1	2

[a] The Mountain Region consists of Multi-County Planning Regions (MCPR) A through E; Piedmont, F-K; and Coastal, L-R.

Source: Research Triangle Institute.

The responses were also classified by the 17 Multi-County Planning Regions. As might be expected, the regions closest to the coast were affected most by the Ports in relative terms. The highest number of firms which specified critically or very significant was in Region F, the Charlotte Region, which also has the largest number of new firms that import or export. The next largest number of such firms were located in the Coastal Regions, N, O, P, and Q. The interpretation of the responses may be open to question because RTI did not provide a definition of "significant" with the questionnaire. It appears reasonable that the firms in the Charlotte area that import or export would have located closer to a port if ports were actually the most critical item in the conduct of their business. As it turns out, Charlotte is approximately 200 miles from either Charleston or Wilmington, a significant distance. One firm in Region A, in the heart of the mountains, claimed that ports were critically significant to their location. This response is difficult to accept unless one assumes that another factor was more significant and perhaps dominated their location decision.

c. Ports Used by Responding Firms

As mentioned above, the questionnaire included a question about ports used for those who said that ocean freight had any significance to the location decision of their establishment. The results from this question are contained in Table 4-10. The responses were classified according to whether the firm said that ocean transportation was critically significant, very significant, or significant, and also by the ports used: North Carolina, Virginia, South Carolina or ports in other states.

Of the 22 establishments that said that ocean freight was critically significant to their decision to locate in North Carolina, 14 of the firms used North Carolina Ports as their principal outlet, while three used ports in other states. The responses of firms that specified the ports of Virginia and South Carolina as their principal outlet were accepted on their face value on the assumption

Table 4-10

Ports Used by Establishments that Consider Ocean Transportation
Significant to Their Location Decision

Number of Establishments Responding

Ports Used	Critically Significant	Very Significant	Significant	Total Significant	Critically Significant	Very Significant	Significant	Total
	State				Mountain Region			
North Carolina	14	3	5	22	0	0	0	0
Virginia	3	6	7	16	1	0	0	1
South Carolina	2	2	9	13	0	1	5	6
Other Ports	3	1	6	10	0	0	1	1
Total	22	12	27	61	1	1	6	8
	Piedmont				Coastal Region			
North Carolina	6	1	3	10	8	2	1	11
Virginia	1	2	7	10	1	4	0	5
South Carolina	1	2	1	4	0	0	2	2
Other Ports	2	0	4	6	2	1	2	5
Total	10	5	15	30	11	7	5	23

Source: Research Triangle Institute

that these ports may be conveniently located to their place of
business. However, the responses of three firms using ports in
states other than North Carolina, South Carolina, or Virginia were
interpreted to mean that if ports were critically significant, some
other factor was more so. The "very significant" and "significant"
categories included more firms that use ports outside North Carolina
than those that use North Carolina Ports. When the three categories
of responses were added together, however, the majority of the firms
used the North Carolina Ports. It seems likely that most of the 14
firms that used North Carolina Ports and said that the Ports were
critically significant to their location would not have located in
North Carolina without the Ports.

The sections of Table 4-10 set out the data for the three prin-
cipal regions. Only eight firms in the Mountain Region specified
ports and none mentioned the North Carolina Ports. Of the 30 firms
in the Piedmont specifying ports, one-third used ports in other
states. Of the ten establishments stating that ocean freight was
critically significant, six used North Carolina Ports. Of the 23
establishments in the Coastal Region specifying ports, 11 used
North Carolina Ports, five used Virginia ports, two used South
Carolina ports and five used ports in other states. In this Region
eight of the 11 firms that said ocean freight was critically signi-
ficant used North Carolina Ports.

3. Analysis of Manufacturing Firm Data

    a. Approach

        The hypothesis of the entire section on industrial location
is that the Ports stimulate economic development. A number of
subhypotheses flowing from the main hypothesis were also put forth
because they were easier to test. One is that firms that import
or export are likely to be closer to the Ports than those that do
not. Another is that the degree to which they export or import
also varies inversely with the distance. A third is that the ratio
of employees in new firms that import or export to employees of
other firms also varies with distance to the port. A fourth is

that the growth of firms that import or export will stimulate
additional development and thus, the coastal regions will grow
faster than those inland.

One means taken to test these hypotheses consisted of analyzing
the data contained in the North Carolina Department of Natural and
Economic Resources (DNER) Inventory of Manufacturing Firms. The
firms that import or export and were established since 1960 were
compared to other firms established since 1960 that do not import
or export. The employment in these firms and their choices of
locations were analyzed in order to help measure the influence
of the Ports.

One reason for using the information in this inventory is
that it contains estimates of the percentage of output that is
exported and percentages of inputs that are imported. These
figures can be used together with employment data to derive es-
timates that might correspond to industrial location effects of
the Ports. The percentage of production that is exported can be
applied to total employment in order to derive the effects of
foreign trade on employment. If the exports can be attributed
to the presence of the North Carolina Ports, then this part of
employment can be attributed to the presence of the Ports.

A conceptual problem arises in regard to imported materials.
Every manufacturing firm transforms material inputs into finished
products; all workers participate in this transformation. Some
firms have located in North Carolina in order to use imported
supplies to produce their products. These imported supplies
enable firms to compete more effectively than they could using
domestic supplies. As a measure of the effect of the Ports, the -
percentage of inputs imported to all inputs was applied to total
employment and the resulting figure was used as employment due to
imports.

These figures tend to overestimate the influence of imports
in the economy because there are alternative sources of the needed

materials and alternative ports for imported materials. The degree
of overestimation probably is not serious and mainly involves firms
that both import and export where some double counting occurs.

Tables 4-11 and 4-12 contain data obtained from the DNER in-
ventory of all manufacturing firms. Table 4-11 includes total
employment in all importing and exporting firms that were established
since 1960, employment in non-importing and exporting firms es-
tablished since 1960, the total number of firms established since
1960 and their total employment, the number of firms existing in
1960, manufacturing employment in 1960 and 1972, and total employ-
ment in 1972. The data are classified into the 17 Regions, the
total State, and the three counties that are closest to the Ports:
New Hanover, Carteret, and Craven. Although Wilmington is in New
Hanover County and Morehead City is in Carteret County, Craven
County is listed for comparative purposes because there is rela-
tively little industrial development in Carteret County itself.
Table 4-12 consists of the ratios of the various series in Table
4-11 plus estimates of the employees in firms that import or ex-
port attributable to the production of exports or processing of
imports.

b. Number of Firms

Column two in Table 4-12 is the ratio of new firms that import
or export to new firms that do not import or export. This ratio
varies significantly from one region to another. The percentage of new
firms that import or export is highest in Region O, which is the
Wilmington area. The next highest Region is Region N, which is
immediately adjacent to Region O and lies on the main route to Charlotte.
The next three Regions are L and Q which lie relatively close to Morehead
City and Region A which is farthest away in the mountains. Although the
percentage of importing or exporting firms is high in Region A, this can-
not be attributed to the North Carolina Ports because these firms use

Table 4-11

Basic Data on 1972 Manufacturing Firms Established Since 1960 by Region

iport ment	Other New Firms		All New Firms	
	No. of Firms	Total Employment	No. of Firms	Total Employment
	28	1,686	36	3,815
	75	4,598	92	7,632
	60	4,160	68	7,480
	36	3,224	42	4,200
	191	8,008	211	10,997
	332	17,494	408	27,318
	444	19,611	510	27,149
	51	3,032	57	4,222
	147	7,239	175	14,990
	40	4,026	49	4,744
	75	6,328	97	8,618
	47	5,073	56	5,655
	54	4,033	71	6,635
	40	2,691	55	5,530
	65	7,648	80	10,213
	47	3,130	61	6,750
	25	937	27	1,722
	1,757	102,918	2,095	157,670
	7	687	8	872
	4	194	8	1,230
	17	535	25	2,494

(Continued)

Table 4-11 (continued)

Basic Data on 1972 Manufacturing Firms Established Since 1960 by Region

Region	Manufacturing Firms as of 1960		Employment, 1972	
	Number	Employment	Manufacturing	Total Employment
A	101	9,290	13,110	40,150
B	212	22,750	30,860	93,820
C	233	22,428	35,980	71,310
D	192	9,234	18,260	53,570
E	531	43,085	72,090	125,810
F	1,044	111,903	160,720	450,260
G	1,373	159,335	201,840	499,260
H	269	12,767	19,110	50,240
J	517	34,456	51,510	276,160
K	198	8,475	18,070	58,550
L	306	17,191	31,620	111,550
M	210	9,524	19,100	95,200
N	149	9,271	23,100	65,170
O	234	9,895	18,530	76,420
P	333	13,255	26,260	138,980
Q	257	7,720	18,550	76,810
R	152	5,270	4,260	30,970
State	6,311	505,849	762,970	2,314,230
Carteret County	39	1,019	1,580	10,050
Craven County	67	2,022	3,440	22,890
New Hanover County	126	6,020	10,160	40,370

Sources: N. C. Department of Natural and Economic Resources, Inventory of Manufacturing Firms 1972.

Employment Security Commission, North Carolina Work Force Estimates (1972), October 1973; adjusted by RTI.

Employment Security Commission, N.C. Insured Employment and Wage Payments, 1960, P. 01-1-100-2; 1971, Table V.

Table 4-12

Comparisons of Manufacturing Firms Established
Since 1960 That Export or Import to Manufacturing
and Total Employment in 1972, by Region

Regions	Ratio of Number of New Firms that Export or Import to Number of All Other Firms	Employment in New Firms Attributed to Exports	Employment in New Firms Attributed to Imports	Employment Attributed to Exports as Percentage of Manufacturing Employment in 1972	Ratio of Employment in New Firms that Export or Import to Total Manufacturing Employment in 1972	Ratio of Employment in New Firms that Export or Import to Total Employment in 1972
A	0.29	42	237	0.32	0.16	0.05
B	0.28	281	164	0.91	0.10	0.03
C	0.13	65	150	0.18	0.09	0.05
D	0.17	16	17	0.09	0.05	0.02
E	0.11	60	204	0.08	0.04	0.02
F	0.23	367	1021	0.23	0.06	0.02
G	0.15	285	303	0.14	0.04	0.02
H	0.12	6	48	0.03	0.06	0.02
J	0.19	1272	258	2.45	0.15	0.03
K	0.23	63	108	0.35	0.04	0.01
L	0.29	1111	108	3.51	0.07	0.02
M	0.19	17	227	0.09	0.03	0.01
N	0.31	148	29	0.64	0.11	0.04
O	0.38	311	295	1.68	0.15	0.04
P	0.23	301	233	1.15	0.10	0.02
Q	0.30	269	85	1.45	0.20	0.05
R	0.08	5	230	0.12	0.18	0.03
State	0.19	4619	3717	0.61	0.07	0.02
Carteret County	0.14	139	0	8.80	0.12	0.02
Craven County	1.00	151	56	4.39	0.32	0.05
New Hanover County	0.47	297	268	2.92	0.19	0.05

4-33

Source: Table 4-11.

ports in other states. The next ranking Regions in terms of the ratio of importing or exporting firms to other firms are Region P, which surrounds Morehead City; Region K, which is the eastern edge of the Piedmont; Region F, including Charlotte; and Region B, including Asheville. Region B also probably is not affected by the North Carolina Ports. Regions D, J, and M rank next in terms of ratio of importing and exporting firms followed by G, H, and C. In general, there is a rather definite progression across the State from east to west in terms of the percentage of new importing or exporting firms to total new firms. This is to be expected because the Ports are in the East and firms that import or export tend to locate close to ports rather than farther away.

In general, the regions closest to the Ports experienced relatively greater growth in the number of firms that import or export than regions farther away from the Ports. On the other hand, these regions have grown at a slower rate as measured by the total number of new firms relative to firms existing in 1960. Thus, the data suggest that the Ports have benefited an area of the State that needs the assistance more than other areas.

c.   Employment

Employment effects of the Ports are a better measure of their industrial development impact than the growth in numbers of new firms attributed to the Ports. That is, a new firm with 500 employees is certainly more significant to the economy of an area than 10 firms with five employees each. The number of employees in importing and exporting firms established since 1960 is listed in the third column of Table 4-11. The largest number of the employees are located in Regions F, G, and J. These Regions also have the highest total employment levels. The coastal Regions in general are well represented in terms of new employees, however. The number of employees in new firms that do not import or export are listed in the fifth column of Table 4-11. In general, the rank of Regions

in this column is similar to those in the third column. The Region with the largest number of new employees in other firms is G followed by F. Regions E, J and P follow the first two in terms of new employees who are employed by firms that do not import or export. In general, the coastal Regions have a higher percentage of total employment in firms that import or export than those farther inland.

Several ratios were calculated to ascertain probable Port effects. The first calculation was to multiply employment in the firms that import or export by the percentage of their product that was exported and by the percentage of imported materials. These numbers are found in columns three and four of Table 4-12. The largest numbers of employees related to exports (more than 1,000) are found in Regions J and L. The next largest groups of employees are found in Regions O, P, Q, and R, which are the coastal counties, Region F and G, which have the highest number of manufacturing employees, and Region B, which is the Asheville area. All of these Regions have between 250 and 350 employees that can be attributed to production for export. By this measure it can be said that the Ports have been quite significant to the stimulation of manufacturing employment in the regions closest to the Ports.

As mentioned, employment attributable to imports was estimated also. The results of these calculations are found in column four of Table 4-12. The Charlotte Region (F) leads the State in the number of employees related to imports with slightly more than 1,000. The next highest regions are O and R, which are coastal regions, and J and G. The third ranking group of regions is M and P; Region P surrounds the Morehead City area. Although this measure is not as definitive as the previous one, the results do indicate that the effects of the Ports are stronger in the adjacent areas than in areas farther inland, with the exception of Region F which is obviously attractive to many types of enterprises.

Another measure to indicate the significance of the Ports to industrial development is the ratio of employment for the production of exports to total manufacturing employment in 1972 (column five of Table 4-12). The results of this comparison are striking in that most of the highest ranking Regions are in the coastal part of the State.

Column six in Table 4-12 is the ratio of total employment in importing and exporting firms established since 1960 to total manufacturing employment in 1972. The Regions with the highest percentages are A, Q, and R. Regions Q and R are both in the eastern part of the State while Region A is in the extreme west. The second highest group consists of Region J which is closer to Morehead City and Wilmington than to ports in other states and Region O, in which Wilmington is located. The next highest Region is N, which is adjacent to the Wilmington Region, followed by Regions B, C, and P. All the coastal regions rank above the average in the ratio of manufacturing employees in firms that import or export to the total number of manufacturing employees.

Because employment in an area consists of more than just manufacturing employment, the employment in importing and exporting firms established since 1960 was compared to total employment in 1972 for each of the Regions (column seven of Table 4-12). The highest ranking Regions are A, C, N, O and Q, indicating that manufacturing employment in new firms that import or export is a significant part of total employment in coastal Regions.

d. Discussion

The analysis of data contained in the DNER Inventory of Manufacturing Firms indicates that the coastal Regions experienced a greater than average growth of employment in firms that import or export. They also have experienced a greater than average growth in manufacturing employment in general. Although the latter type of growth cannot be attributed to the presence of the Ports, the former probably had some influence on the latter. That is, growth

in employment related to exports or imports may have served as a
stimulus to employment in firms using domestic supplies or pro-
ducing for the domestic market. The presence of some firms make
an area more attractive to additional firms because of the pos-
sibility of external economies such as the availability of skilled
workers and specialized business services. In any case, the Ports
give a comparative advantage to coastal Regions that the Regions
further inland do not enjoy as fully. In view of the substantial
gap in per capita income between the Piedmont and Coastal Region,
this comparative advantage is an important factor in improving the
Coastal Region's relative level of per capita income.

4.   Opinions of Experts in Economic Development

A number of individuals working in the field of industrial develop-
ment in North Carolina were consulted in order to obtain their opinions
on the significance of the Ports to local economic development.[1]
Their comments indicated that the Ports were most significant in terms
of stimulating industrial location within a small radius of the ports.
For this reason, the comments and observations are separated into the
two port areas. Included is a list of firms whose location can be at-
tributed primarily to the influence of the Ports.[2]

a.   Wilmington

The economic environment for industrial development in Wilmington
is good even apart from the Port facilities: inland water transpor-
tation is available throughout the area; the industrial water supply
is good and has been responsible for various developments in the
past; some good waterfront land is still available as is land in
adjoining counties; and there remains a fair supply of trainable
labor at wages that are low by national standards but above prevailing

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[1] Mr. E. E. Lee, Jr. of the North Carolina SPA; Mr. Van Reid of the
Greater Wilmington Chamber of Commerce; Mr. Hugh Branch of the Committee
of One Hundred in Wilmington; Mr. Beverly Paul of the Cape Fear Council
of Governments; Mr. Joseph Dunn of the University of North Carolina-
Wilmington; Mr. Roy Stevens of the Carteret County Economic Development
Council; Mr. Mack Simpson of the Neuse River Council of Governments; and
Mr. Thomas Willis of East Carolina University.

[2] The employment and income associated with the firms listed in this
section have been included in the indirect effects analyzed in section
A.3 of this chapter.

rates. For example, the initial hiring rates at General Electric, Hercules, and Dupont were about $3.85 per hour, which attracted workers from a wide geographic area. Of course, many of these workers were already employed and their previous employers might have been hard pressed to find replacements at prevailing wages. In other words, there is ample opportunity for firms to locate that are capital intensive and are prepared to pay wages higher than those prevailing in the area. Similarly, low wage industries can expect to be squeezed out if present developments continue. Such a situation is normal for growing areas.

Port developments in the Wilmington area consist of State owned docks and private terminals. Their activities interact to produce a better port than either one of them could produce alone. The State owned docks offer general cargo services that are attractive to many different types of industry. The privately owned docks, especially the petroleum terminals, generate substantial tonnages that bring in ships and help justify deepening of the channel. The primary justification for deepening the channel at Wilmington was based on petroleum traffic.

Some firms recently have located in the Wilmington area solely because of the availability of water transportation at the State docks or private terminals. Some of these companies are E. I. Dupont deNemours, the Ideal Cement Company, Hercules, Inc., and W. R. Grace with employment respectively of 2,500, 151, 400 and 203, all for 1973. The Diamond Shamrock Chemical Company came to Wilmington partly because of the State Ports, but does not use them to any great degree. Three other major firms have announced plans to locate in the Wilmington area and will use water transportation. These are Pfizer, Inc., International Gypsum, and Consolidated Diesel Electric.

Other companies located in the area before the State Port Authority was founded. Some examples of these are Babcock and Wilcox, American Molasses Company and Wertheimer Bag Company with employment of 725, 32, and 90 respectively in 1973. Some other firms that use water transportation significantly include Allied Chemical Corporation (employment - 66), Corning Glass (400), Deutsch Relay

Division (70), Eastern Rebuilders (250), General Electric (1,800), Roll Form Products (19), Mobil Textiles (150), Singer Corporation (500), Federal Paper (1,450) and Allied Chemical (66) at Reigelwood (all employment figures are for 1973).

Some plants located close to the Ports were more influenced by the Ports in their decision to locate than firms farther away. The Ports could be said to have determined their location because of the requirements for being at a port location. That is, they are unlikely to have located in North Carolina without the Ports. Twenty five firms in the Wilmington area are listed on Table 4-13. The estimated employment figures in 1973 are approximately 8,000 in the Wilmington area, approximately 22 percent of the total employment of New Hanover County. Although income figures are not available from these firms, estimates can be made. The base wage rate is probably about $3.00 per hour according to the Employment Security Commission data. Then annual income per employee is $6,240, which can be rounded off to $6,500 to account for higher paid personnel (this is a very conservative figure). Thus, the total wages and salaries would be roughly $54 million.

The location of these firms in the Wilmington area has contributed to rapid growth during the 1960's in both employment and income. As mentioned above, new industries tend to draw labor away from existing low wage industries so that the effects on income are more dramatic. The average income per household in New Hanover County rose from $8,064 in 1967 to $11,113 in 1971. This is a more rapid increase than the other metropolitan counties in North Carolina experienced during the same period.

b. Morehead City

The effects of the Port on the Morehead City area are smaller than the effects in the Wilmington area. One reason for this is the smaller population and the lack of available land near the Port. The only firms that definitely can be attributed to the Ports are the Weyerhauser Company in New Bern, Frye Roofing in Morehead City and Atlantic Veneers in Beaufort. The Texas Gulf operation at Aurora located there because of the phosphate deposits but may not

Table 4-13

Total Employment in Manufacturing Firms Dependent on Port Services

Firms	Employment
Wilmington	
Babcock and Wilcox	725
Hercules	400
Dupont	2,500
W. R. Grace	203
Wilmington Chemical Terminal	15
Roll Form Products	19
Carolina Salt	6
Wilmington Port Kilns	75
Pace Oil and Refining	35
Ideal Cement	151
Diamond Shamrock	200
General Electric	1,800
Federal Paper	1,450
Allied Chemical	66
Corning Glass	400
Deutsch Relay	70
Superior Stone	32
American Molasses	32
Wertheimer Bag	90
S & G Prestress Concrete	40
Total, Wilmington	8,309
Morehead City	
Texasgulf	682
Atlantic Veneers	185
Weyerhauser	300
Frye Roofing	75
Total, Morehead City	1,242
Combined	
Total	9,551

Source: Research Triangle Institute.

have begun operations in 1967 if the Morehead City Port had not been there to facilitate shipments. The employment at these firms in 1972 was 300, 75, 185, and 682 respectively. The total of approximately 1,250 was 13.0 percent of the total of 9,590 people employed in Carteret County in 1971. At an average of $6,500 each, the annual earnings are $8 million.

The largest enterprise in this part of the State is the Camp Lejeune Marine Base, which has been a great stimulus to development of the area. The Marine Base depends on the Morehead City Port for the movement of personnel and equipment during peace and war.

c.   Conclusion

The conclusions about industrial development drawn from interviews with experts on the eastern North Carolina economy are similar to those obtained from the survey of manufacturing firms and analysis of the DNER data base. The effects of the ports on the location decisions of firms are strongest in the immediate areas of the Ports and decline slowly with distance. The effects in the Wilmington area have been much stronger than in the Morehead City area, in part at least because of a larger labor force and superior transportation facilities. Twenty manufacturing firms employing 8,300 persons were listed as being dependent on port services. These firms use private port facilities as well as the State-owned docks. Four firms employing more than 1,200 persons in the Morehead City area can be attributed to the industrial location effects of the Port. All these firms use the State-owned docks, which are much more extensive than the privately-owned docks. The operation of the Ports improves the industrial climate of these areas for all types of firms.

Chapter 5

Determinants of Port Activity

Port activity refers to the volume and type of cargo moving over the
SPA docks at Wilmington and Morehead City. Determinants are factors that
affect the volume but cannot be combined to make projections of port activity
because of their complex interactions. While a fixed relationship cannot be
established between all the determinants and the volume of cargo, the
discussion of the determinants should be useful in modifying the projections
when conditions change. Some of the determinants have been projected in this
chapter; all projections of the volume of cargo, however, are found in
Chapter 6.

Three determinants of port activity are analyzed in this chapter.
Section A includes reviews of the national economy and trends in foreign
trade, the Southeastern region, and the North Carolina economy including
projections of key sectors. The second determinant is the tributary area
for each port, with special emphasis on inland freight rates and significant
commodities (Section B). The third determinant is the competitive position
of the North Carolina Ports vis a vis those in other states. Items included
in this category are ocean service, inland transportation services, port
terminal charges and costs, containerization, the current balance of cargo
among ports, possible new business, and solicitation. Comments by foreign
and domestic freight forwarders are mentioned in the appropriate parts of
this section. These comments are significant because freight forwarders
expedite the movement of cargo from one point to another by choosing the
ports and inland transportation routes that best serve their customers.
Foreign freight forwarders in Charlotte and American freight forwarders
operating out of Wilmington, Morehead City and Charlotte were asked for their
opinions about the merits of the ports in South Carolina, North Carolina and
Virginia.

Perhaps the most important, or underlying, determinant affecting the
volume of foreign trade is the economies of the nation, region, and State.
The other two determinants greatly alter the influence of this first determinant

however, and need to be considered. The fact that the growth in cargo handled at the North Carolina Ports exceeded the growth of the national economy, regional economy, and total U.S. shipping demonstrates this point. For this reason, all the determinants were considered in making the projections found in Chapter 6.

A. The Economy and Foreign Trade

The underlying determinant of cargo through the North Carolina Ports is the volume of foreign trade at the national level, which is largely a function of the national economy (the regional economy tends to resemble the national economy although it may grow faster or slower). Foreign trade is a function of the economy, government regulation of foreign trade, and exchange rates. Past trends in foreign trade do not always appear to be a good guide to the future because a change in trends occurred during the past year. Devaluation of the dollar and the need for American food in Europe and other parts of the world have stimulated exports; on the other hand, devaluation has slightly stemmed imports but not to the same degree. The effect has been to bring the balance of trade into a small surplus with exports expected to grow at about 6.4 percent annually (in dollar terms) and imports at about 6.3 percent. [1]

The rate of long run economic growth is a function of the growth in labor supply and productivity. In the short run, of course, under-utilized physical and human resources will permit economic growth rates in excess of those for population and productivity. Population in the U.S. is growing at about 1.1 percent annually, although the labor force is growing faster because of the changing age distribution and the continued entrance of married women into the labor force. Productivity is growing between two and three and one-half percent annually with the lower figure more frequently observed. Thus, the annual growth in output in real terms in the next 10-20 years is projected to be about four percent. [2]

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[1] Working estimates provided by the foreign trade division of the U.S. Department of Commerce.

[2] U. S. Department of Commerce, 1972 OBERS Projections: Economic Activity in the U. S., Vol. 1, Concepts, Methodology, and Summary Data, (Washington, D.C.: Government Printing Office, 1972), pp. 12-14.

Foreign trade is growing more rapidly than the total economy because the export oriented sectors are growing more rapidly than the remainder of the economy. The preeminent example in this category is agriculture. Similarly, the demand for certain imports is growing more rapidly than four percent annually because (1) imports often grow at the expense of various domestic alternatives, and (2) the demand for specific importable items is growing faster than overall consumption.

Some regions of the country grow faster than the national average. The Southeast, in general, is expected to grow more rapidly than the rest of the U.S. For example, per capita personal income in North Carolina relative to the U.S. average is expected to increase from .81 in 1969 to .83 in 1980, to .85 in 1990. At the same time, population in the State will grow faster than in the U.S. Other states in the Southeast that use North Carolina Ports will experience similar growth: South Carolina's relative per capita personal income will rise from .74 in 1969 to .77 in 1980, to .81 in 1990, while Virginia's will increase from .90 in 1969 to .93 in 1980 to .95 in 1990.[1]

The growth in tonnage of foreign trade through the North Carolina Ports will be greater than the growth in personal income in North Carolina, which will increase from $13.9 billion in 1969 to $22.5 billion in 1980, to $33.9 billion in 1990, all in constant (1967) dollars.[2] The rapid growth in foreign trade at the national level and the larger share going through the North Carolina Ports are the major reasons for this projection. Such a projection might be surprising because an increasing proportion of income is spent on services, which are produced domestically, rather than on goods, which can be imported. Nevertheless, growth in the production and consumption of goods is concentrated on products that are more likely to be imported and exported than other goods. Another reason the tonnage of foreign trade through North Carolina Ports will grow more rapidly than personal income is the presence of phosphate exports, which will account for about 40 percent of the growth in cargo through the Ports. The phosphate exports are not affected by the growth of personal income in North Carolina.

Not all the exports that originate in North Carolina or imports that are destined for North Carolina pass through the North Carolina Ports, as

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[1] U.S. Department of Commerce, 1972 OBERS Projections: Economic Activity in the U. S., Vol. 5, States, (Washington, D.C.: Government Printing Office, 1972), p. 140.

[2] Ibid.

reviewed in an earlier section of this report. For these reasons,
economic growth in the State may not be a good predictor of cargo through
the State Ports. Furthermore, the commodities such as grain or soybeans
that are leading the growth of exports nationally are not produced for export
in large quantities in North Carolina. The leading crop, tobacco, is exported
in large quantities, but total U.S. exports of tobacco are not growing. Paper
and paper products result from timber production in the State, but the domestic
market has first claim on the output. Other products that may be important
in foreign trade in the future do not currently move through North Carolina
Ports. In conclusion, the projections of the State and regional economy are
not a complete guide to the volume of cargo through the North Carolina Ports
because of the use of other ports and uncertainty over whether production
would go into the domestic or foreign markets.

Table 5-1 contains data on exports of manufactured goods from North
Carolina, total earnings in manufacturing, and production of agricultural
goods, timber, minerals, and manufactured goods. Projections of output in
real terms are also included. These projections provide the magnitude of
output that can be expected in these sectors; the amount of foreign trade
associated with total output is less certain. Exports of manufactured goods
were estimated for 1980 and 1990 based on projections of earnings in manu-
facturing by the U. S. Commerce Department and the relationship between exports
of manufactured goods and earnings in manufacturing. Exports manufactured in
North Carolina grew by 46 percent from 1960 to 1969 in constant dollars. The
value of exports of manufactured goods declined from about 22 percent of total
earnings in 1960 to 17 percent in 1969; the percentage is assumed to rise to
20 percent in 1980 and 1990 because of devaluation. Exports of North
Carolina manufactured goods in 1967 dollars then will be about $1.2 billion in
1980 and $1.75 billion in 1990. Total exports of manufactured goods in real
terms would be 80 percent greater in 1980 than in 1969 and 44 percent greater
in 1990 than in 1980.

The index of manufacturing production gives another indication of growth
in real terms. Physical output in 1980 in manufacturing could be 66 percent
higher than in 1969 and two and one-half times greater in 1990 than in 1969
(50 percent higher in 1990 than 1980) based on the OBERS projections. Exports

Table 5-1

Production and Export of North Carolina Manufactured
and Agricultural Commodities

	Exports of Manufactured Products (Millions of 1967 Dollars)	Total Earnings in Manufacturing (Millions of 1967 Dollars)	Exports as a Percentage of Earnings
1960	464.0 [a]	2,123.2 [b]	21.9
1963	491.0 [a]	2,405.6 [c]	20.4
1966	578.0 [a]	2,840.5 [d]	20.3
1969	678.0 [a]	3,943.7	17.2
1980	1,223.4 [e]	6,117.1	20.0
1990	1,756.9 [e]	8,784.4	20.0

Indexes of Production (1969 = 100)

	Crop Production	Livestock	Mining	Manufacturing
1969	100	100	100	100
1980	118	131	143	166
1990	124	161	195	247
2000	136	192	247	376

Timber Production and Output
(Thousand Cubic Feet)

	Sawlogs, Veneer Logs and Other Industrial Products	Pulpwood
1964	297,000	140,000
1980	660,000	310,000
2000	930,000	540,000

[a] Converted to 1967 dollars using the GNP implicit price deflator.

[b] 1959.

[c] 1962.

[d] Estimated based on 1962 and 1968 data.

[e] Calculated by multiplying the last two columns together.

Source: U.S. Department of Commerce, Exports from North Carolina, 1969, State Export
Origin Series. Washington, D.C.: Government Printing Office, 1971, pp. 2-4.
U.S. Department of Commerce, 1972 OBERS Projections Economic Activity in the
United States, Vol. 5, States. Washington, D.C.: Government Printing Office,
1972, pp. 140-43.

and other movements through the ports could increase to the same degree or even greater. Faster growth through the North Carolina Ports is the more likely outcome because the larger movements would stimulate more frequent ship service, which would then attract North Carolina cargo that had been moving through ports in other states. Of course, a small number of new plants which specialize in imports or exports would greatly modify the quantities of exports and imports expected from the overall composition of the economy.

Agricultural production was expected to grow rather slowly from 1969 to 1980 based on projections made in 1970-71. Total agricultural exports in North Carolina grew from $251.7 million in 1959-60 to $406.4 million in 1969-70, an increase of 61 percent. Price rises were responsible for much of the increase, however. The devaluation and increased demand for food products will probably raise output above the projected levels. At the present time, very little agricultural production in North Carolina is exported through North Carolina Ports with the exception of tobacco. Tobacco production is unlikely to grow in the future, although a larger share of exports could move through North Carolina Ports. Increased production for export of other crops could shift export shipments to the North Carolina Ports to take advantage of lower inland freight rates. Ship service and port facilities would be required, but they would appear in response to sufficient demand.

Lumber and pulpwood production are expected to grow in the State. Very small quantities of sawlogs or lumber are exported presently; larger quantities of pulpwood are exported. Much of the pulpwood is processed into woodpulp before export. There is a great worldwide demand for paper and paperboard products so this export is likely to increase.

B. Tributary Area

The tributary area of a port refers to the area "within which the port generally has certain advantages over other more distant ports in the promotion and attraction of waterborne cargoes moving in the foreign and coastal trades. One such advantage is that of favorable and/or competitive inland freight rates."[1] Inland freight rates depend upon the distance between two points,

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[1] Harry C. Jackson, "Factors Influencing the Movement of Waterborne Cargoes through the Port of Morehead City," unpublished (Wilmington: State Ports Authority, August 7, 1973), p. 1.

the road and rail facilities, the type and quantity of cargo, and negotiations. The freight rates serve to define the region within which much, if not most, of the cargo of a port will originate or be destined. Of course, some cargo will originate in or be destined for other areas because the shipments are too small to divide among more than one port or for other reasons.

The tributary areas of Wilmington and Morehead City differ greatly in size, with the Wilmington area exceeding the Morehead City by about three times in size, population, and economic production. The Wilmington area extends into South Carolina, and then runs roughly northwest including Rock Hill, South Carolina, Charlotte, Gastonia, Shelby, then to the north including Hickory, Lenior, and Mount Airy, east to Reidsville, and then southeast including Burlington, Chapel Hill, Smithfield and Jacksonville. Major population centers are included such as Charlotte, Winston-Salem, Greensboro, and Fayetteville. The Morehead City area lies north of the Wilmington area and shares the same borderline to Burlington, its westernmost point. The boundary then heads east to Roxsboro, Rocky Mount, and Williamston. The only major population centers are Rocky Mount, Goldsboro, Wilson, Greenville, and New Bern. The freight rates from Raleigh and Durham are the same to Wilmington and Morehead City so the choice of port depends on other factors such as frequency of ocean service.

The tributary areas based on rates prevailing in the 1950's are shown in Exhibit 5-1. The class rates used to determine these tributary areas have not changed much since then, although many specific rates have changed or been established for the first time. The shaded areas are ones in which the rates between the North Carolina Port and the competing port in another state are equal. Rates between Wilmington and Morehead City are equalized in the cross-hatched area.

The amount of economic activity within the tributary area is much more important than the size of the area. Much of the Morehead City area is swampy, has a low density of population, is poor, and has relatively little industrial activity. Although industry is moving into the area and increasing the volume of traffic, the Port will always have a smaller tributary area than Wilmington on the south and Hampton Roads on the north so long as freight rates are closely related to distance. The tributary area of Wilmington includes almost all of the major population and industrial centers of North Carolina, while Morehead City's tributary area is predominantly rural.

— Boundary of

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Area of equ
and a port

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Morehead Ci

Source: Me

Exhibit 5-1. North Carolina State Ports Tributary Area

Wilmington Tributary Area

Morehead City Tributary Area

rates between North Carolina Ports
another state

rates between Wilmington and

randum from Traffic Department of State Ports Development.
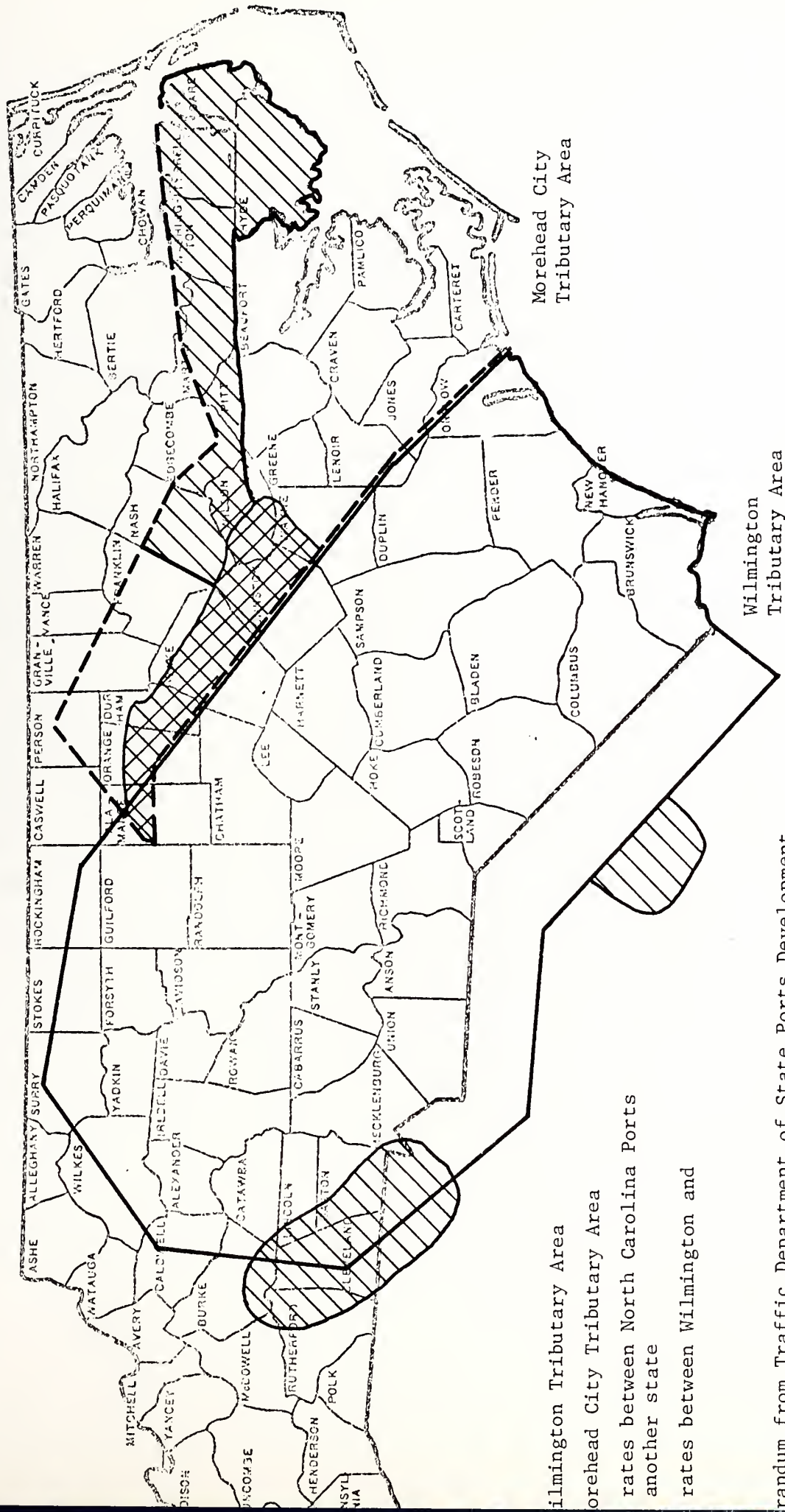
Inland freight rates are the major factor determining tributary areas, but they do not guarantee that traffic originating in or destined for a particular port's tributary area will use that port. For example, a company may use its own fleet of trucks and be more concerned about the time required to reach the port rather than the freight rates charged by motor carriers. That is, a good highway may offset an unfavorable freight rate. A firm with its own trucks may make runs to another region of the country and hence, find it more advantageous to use a port in that region to avoid an empty backhaul. Nevertheless, freight rates are important. Table 5-2 contains class rates for motor carriers and rail to 17 points in North Carolina. Each point is located in one of the 17 Multi-County Planning Regions. Morehead City has the lowest exclusive rates for only two points and shares the lowest rates with another port at two other points. Wilmington has lowest rates in eight Multi-County Planning Regions and shares the lowest rates in two others. Both Charleston and Norfolk each have two points where they have the lowest rates to the MCPR.

While the size and economic development of the tributary area is an important determinant of the future growth of a port, the type of economic activity is also important. That is, a few firms and commodities may account for a very large portion of the port's business even though these firms and commodities are relatively insignificant in terms of the total tributary area. For example, phosphate, Bunker C fuel oil, asphalt, fishmeal and woodpulp, which account for the bulk of the tonnage at Morehead City, are handled by only one or two firms, yet are relatively insignificant in the economy of the total tributary area of the Port. A slightly larger group of companies are responsible for most of the tobacco and lumber movements. At Wilmington the situation is similar with a few companies generating the movement of bulk chemicals, woodpulp, tobacco, salt, and several other items. A few more firms are responsible for the lumber and steel cargo. The problem with this concentration is that one firm producing or using waterborne commodities can have a major effect on the quantity of tonnage through the Ports; such effects cannot be projected with any certainty.

Table 5-2

Rail Rates - Class 45
(Cents Per 100 Pounds)

Between And	Charleston, S.C.		Wilmington, N.C.		Morehead City, N.C.		Norfolk, Va.	
	Rate [a] Basis	Base [b] Rate	Rate [a] Basis	Base [b] Rate	Rate [a] Basis	Base [b] Rate	Rate [a] Basis	Base [b] Rate
Murphy, N.C.	410	202	446	210	519	223	533	230
Asheville, N.C.	292	171	329	182	402	202	416	202
Shelby, N.C.	257	162	242	162	340	182	361	192
North Wilkesboro, N.C.	332	182	282	171	313	176	328	182
Hickory, N.C.	278	165	247	162	320	176	334	182
Charlotte, N.C.	220	147	189	139	286	171	321	182
Winston-Salem, N.C.	257	162	208	146	242	162	256	162
Rockingham, N.C.	157	130	111	115	213	147	263	165
Raleigh, N.C.	247	162	132	124	132	124	173	137
Henderson, N.C.	289	171	174	137	174	137	131	124
Rocky Mount, N.C.	274	165	124	119	117	115	114	115
Fayetteville, N.C.	183	139	84	104	153	130	203	146
Lumberton, N.C.	164	135	67	97	179	137	247	162
Wilmington, N.C.	195	142	–	–	112	115	237	182
Winston, N.C.	278	165	110	113	58	92	147	127
Greenville, N.C.	293	171	135	124	73	99	119	115
Edenton, N.C.	360F	194	174F	143	112F	121	74F	105

a/ Rate Basis is the distance.

b/ Base Rate is the rate per hundred pounds on a 45,000 pound minimum shipment.

Source: Tariff Authority: SFTB 1011-A, October 9, 1973.

Table 5-2 (con't)

Motor Carrier Rates – Class 45
(Cents Per 100 Pounds)

Between / And	Charleston, S.C. Rate Basis a/	Charleston, S.C. Base Rate b/	Wilmington, N.C. Rate Basis a/	Wilmington, N.C. Base Rate b/	Morehead City, N.C. Rate Basis a/	Morehead City, N.C. Base Rate b/	Norfolk, Va. Rate Basis a/	Norfolk, Va. Base Rate b/
Murphy, N.C.	410	148	446	153	519	164	533	168
Asheville, N.C.	292	123	329	132	402	148	416	148
Shelby, N.C.	257	115	242	115	340	132	361	140
North Wilkesboro, N.C.	332	132	282	123	313	127	328	132
Hickory, N.C.	278	119	247	115	320	127	334	132
Charlotte, N.C.	220	109	189	103	286	123	321	132
Winston-Salem, N.C.	257	115	208	107	242	115	256	115
Rockingham, N.C.	157	95	111	84	213	109	263	119
Raleigh, N.C.	247	115	132	91	132	91	173	101
Henderson, N.C.	289	123	174	101	174	101	131	91
Rocky Mount, N.C.	274	119	124	89	117	84	114	84
Fayetteville, N.C.	183	103	84	74	153	95	203	107
Lumberton, N.C.	164	99	67	70	179	101	247	115
Wilmington, N.C.	195	104	–	–	112	84	237	112
Winston, N.C.	278	119	110	82	58	67	147	93
Greenville, N.C.	293	123	135	91	73	71	119	84
Edenton, N.C.	420	148	220	109	150	93	100	79

a/ Rate Basis is the distance.

b/ Base Rate is the rate per hundred pounds on a 45,000 pound minimum shipment.

Source: Tariff Authority: SMCRC 501-D, October 9, 1973.

5-11

C. Competition with Other Ports

Another determinant influencing the growth of tonnage at the North Carolina Ports is their ability to compete with ports in other states. The major origin and destination points are a hundred or more miles inland; while the freight rates do vary to the various ports, the differences are small enough to be offset by other considerations. In this section, a number of such considerations will be examined: ocean service; inland transportation facilities and service; terminal charges and costs; containerization; the current balance among ports; and other factors about the ports observed by freight forwarders.

1. Ocean Service

The important aspect of ocean service is the frequency of service to various parts of the world because the ocean rates are the same for all the ports in a particular region. For example, the North Carolina Ports are in the South Atlantic region, which stretches from Morehead City to Miami, Florida. The North Atlantic region is from Norfolk north to the Canadian border. At the present time, rates to most places in Europe are the same from both the North Atlantic and South Atlantic ports.

Ocean service refers to the number and type of ships calling at a port, the scheduled service at the port, and the number of destinations served. The availability of container service to various points is an additional consideration in the discussion of ocean service. In general, the North Carolina Ports compare unfavorably to most of the other major ports on the East Coast in ocean service. One indicator of the low level of service is the fact that the State Ports Authority did not publish a schedule of sailings until a few months ago because it would point up the relatively small number of sailings.

Difficulties exist in comparing the amount of ocean service at the North Carolina Ports with ports in other states. Three categories of ocean service exist: scheduled service with a published schedule rigidly adhered to; regular service between two points but the scheduling is not published; and inducement service whereby a ship calls at a port only when there is cargo. Inducement service may be on a regular basis for part of

the year. Morehead City does not have scheduled or regular service; Wilmington has scheduled service as well as regular service from a number of steamship companies, but only to certain regions of the world. The State Ports Authority can advertise and sell regular service even though it is not strictly scheduled. Wilmington compares poorly to ports in other states in terms of scheduled service, but does have good regular service. Morehead City does not have regular service for the entire year, although during the tobacco season, which lasts three or four months, it does have regular service to a number of different points. The service at Morehead City is on an inducement basis, which means that the ships may stop to drop off cargo, but may not be able to pick up any because of commitments to take full loads of cargo in other ports.

Norfolk has scheduled service and regular service to all points of the globe on a very frequent basis. Although much of the tonnage is made up of bulk commodities, particularly coal, general cargo can be carried on these ships. For example, a ship picking up coal in Norfolk to carry to Mexico may put general cargo on top of the coal just under the hatches. The amount of cargo flowing to the port in Mexico would be insufficient for a regular break-bulk ship, but is profitable to carry along with the coal. Service from Norfolk by general cargo ships is also outstanding.

Charleston in the last two years has gained increased service to various places around the world. Much of this new service can probably be attributed to the new container facilities built by appropriations of $38 million from the South Carolina legislature. The South American service from Charleston is superior to Wilmington, as is container service to the Far East, which Wilmington does not have. Nevertheless, the Norfolk ports featuring frequent service are considered more of a competitive threat than Charleston by North Carolina SPA officials.

Another dimension of ocean service is the destination of sailings from the ports. The North Carolina Ports have fairly good service to the United Kingdom, Northern Europe, and the Far East (although no container

service to the Far East). The service to southern Europe, the Near East and Mediterranean is at a much lower level of service. The service to South America, New Zealand and Africa is very poor. The North Carolina Ports certainly are at a disadvantage in obtaining shipments to and from these various points. For example, the North Carolina furniture industry imports hardware from Italy but brings it in through Norfolk because there is no service to Italy at the North Carolina Ports.

The lack of ocean service at the North Carolina Ports, particularly scheduled service at Morehead City, is one of the main obstacles to further development. According to conversations with a number of freight forwarders, ocean service is the most serious problem in using the North Carolina Ports. These Ports compare unfavorably with the other ports in both breakbulk and container service. Foreign freight forwarders say they do not even consider Morehead City for general cargo because of its low level of ocean service.

2. Inland Transportation Services

The Port of Wilmington is served by the main line of the Seaboard Coast Railroad. The Port has good service in the north-south direction and also east to west. The only significant drawback is that the rail line passes through a large part of the city with grade level crossings.

Morehead City is served primarily by the Southern Railroad System, which operates service into Morehead City over the State-owned Atlantic and East Coast Railroad. Morehead City is off the major north-south routes, although it does have relatively good connections in the east-west direction. The Beaufort-Morehead City area suffers from a lack of railroad sidings. Another problem is that the railroad runs down the middle of the main street of the city and trains severely disrupt traffic. A third problem is that the rails are less than full strength.

Wilmington is well-served by trucking lines with at least 20 terminals; Morehead City, on the other hand, has only one terminal. One reason for the poor truck service in Morehead City is that there is virtually no industrial development in the area that would require truck services. The significant economic enterprises either ship by rail, have their own trucks, or utilize truck lines located inland.

Although the North Carolina Ports are not discriminated against by truck freight rates, which generally are set strictly on the basis of distance, they do suffer from inferior highway connections. Trucking companies will choose the route and destination that maximizes their profits if given the opportunity. Interstate highways and other four lane roads generally reduce their costs because of faster trips and lower fuel costs due to the absence of stop and go driving. Some stretches of four lane highway lie between Wilmington and Charlotte, but none extend to the northern Piedmont of the State. Charleston, on the other hand, has an interstate highway to Charlotte. Interstate roads also link the northern Piedmont with the Virginia ports. A virtually complete four lane highway connects Morehead City to the Piedmont, but freight rates to Morehead City are usually higher than to other ports. The truck lines are often instrumental in the decision to use one port versus another. According to officials of several shipping companies, some of the truck companies in Charlotte actively encourage customers to use Charleston rather than Wilmington for the reasons mentioned above.

Various freight forwarders said that inland freight rates are not a problem at Wilmington but are at Morehead City. The rate differentials that favor Wilmington over Charleston or Norfolk are often not sufficiently large to be decisive in choosing a port, particularly for high value cargo with a strict time requirement. Inland freight connections and ocean service generally outweigh the importance of inland freight rates.

3. Port Terminal Charges and Costs

Port terminal costs include the actual handling costs to the shipper, wharfage and dockage, delays that might be encountered, damages, losses from pilferage, and so forth. Daily terminal charges are the same at all ports in the South Atlantic region because the terminal operators have agreed to equal rates. The rates at Norfolk were lower than the South Atlantic rates in the past but now are equal because the Norfolk port operators also meet with the South Atlantic port operators to discuss rates.

Significant port costs other than terminal charges vary from one port to another. A very real cost, for example, is the congestion encountered at the ports. If a ship has to sit at anchor waiting for a berth, unexpected costs are incurred by the ship owner. If the ship is at a berth but is waiting to be unloaded, then the ship owner has the additional costs of wharfage and dockage. Other reasons for delay include inspection by customs personnel and problems with inland freight movements. Another significant cost is damage or loss due to pilferage. Insurance claims usually cover these losses, but frequent claims raise insurance rates.

According to various freight forwarders, Morehead City and Wilmington presently compare very favorably with other ports in the lack of congestion, low handling rates, low pilferage and/or insurance rates, efficient customs inspection, and efficient transportation movements out of the Port areas. Terminal charges are generally the same at all ports, although complaints were voiced that ports do not make serious attempts to control costs and consequently, must charge more. Nevertheless, one freight fowarder called the North Carolina SPA the best run port authority in the country.

4. Containerization

Containerization is an important factor that will influence the further development of the North Carolina Ports. Containerization is especially important in obtaining high value general cargo that generates jobs at the port areas as well as inland. As will be seen, container- ization is also relevant to the export tobacco trade, which accounts for 70 percent of the value of civilian cargo through the Port of Morehead City. Ports that do not participate fully in containerization will be resigned to stagnation and/or concentration in low value, low economic benefit bulk commodities. That is, the number of jobs and amount of income associated with each ton of cargo will continue to be small.

The container evolution is already well underway. Probably more than half of all cargo suitable for containerization is already being carried in containers. Most containers are carried onboard ships that carry only containers. Such ships are expensive to build and operate but offer lower charges and faster service than breakbulk ships if

the turnaround times are short. Yet neither of the North Carolina Ports is equipped with specialized container handling cranes that reduce turnaround times.

Presently weekly container service to northern Europe is provided by one company at Wilmington, while Morehead City has no container service. Charleston, by contrast, has container service by three companies to various destinations including the Far East. Norfolk has service to all points of the world virtually on a daily basis.

The paucity of container service at Wilmington and its complete absence at Morehead City may be serious impediments to continued growth at both Ports. The lack of competition at Wilmington means that shippers must be satisfied with the service from the one company or use some other port; scattered complaints were voiced during the course of the project. The absence of container service to the Far East is also a serious problem in view of the present heavy trade in tobacco and consumer goods with that part of the world; shippers who desire to ship or receive their goods in containers must use other ports.

The freight forwarders frequently mentioned the lack of container service as a serious deficiency at Wilmington and Morehead City. The lack of competition in container service at Wilmington means that the service is often below standards. For example, unconsolidated freight has been left lying around uncovered in the past. The container company serving Wilmington is said to be more inflexible on rates than companies (including itself) operating through ports in other states. Even Savannah, which had not been considered as competition in the past, is a threat because four container lines serve it and are eager to get business. Some containers with a Wilmington bill of lading have been unloaded at Savannah and trucked to Wilmington with the shipping company paying the added inland freight cost. Additional container lines at Wilmington are considered necessary to give more frequent and competitive service to Europe and the Far East.

Although most of the commodities handled at Morehead City do not presently move in containers, tobacco is beginning to. In fact, more than 30,000 tons of export tobacco moved from Morehead City to Wilmington in part because of the container service available there. The container line considered Morehead City as an alternative to Wilmington but did not choose it

because of the lack of imports to balance against exports. While most tobacco is now packed in 48 inch hogsheads which are not suitable for standard 8 by 8 foot containers, most tobacco will ultimately travel in containers because of the reduction in damage to the tobacco. The tobacco moving through Wilmington travels in new nine and one-half feet high containers. A more likely possibility for leaf tobacco moving to the Far East is a change in the size or shape of hogsheads. The majority of tobacco exported through Morehead City is shipped to Japan, which is completely equipped to use 48 inch hogsheads. But the system will change as the old hogshead handling equipment needs to be replaced in four or five years. At that time, Morehead City may begin to lose additional tobacco to other ports if it does not have container service to the Far East. Because all container service is presently scheduled and relies on two-way trade, either Morehead City will get scheduled service and more containerizable imports, or it will not continue to handle tobacco. One other possibility (that does not exist at the present time) would be for container ships to call at Morehead City to pick up containers without dropping off any. The feasibility of this possibility is unknown.

An important aspect of containerization is the question of container cranes. These are specialized bridge-type cranes that lift containers with a four point grip that keeps the container straight so that it can be placed on the ship or on a truck chassis quickly and accurately. A gantry crane can be modified to handle containers, but it is slower and requires two men on the ground to guide containers into place. While the rental charge per hour on a gantry crane is lower than for a container crane, the saving does not offset the added cost of staying in port longer. The cost of operating such a ship is $20-25,000 per day or about $1,000 per hour. The rental saving on a gantry crane is less than $200 per hour, which does not offset its lower productivity. While Wilmington was successful in getting container service from one line with the modified gantry crane, additional service may depend upon getting a container crane. As one shipping company executive put it, "You don't use no gantry crane for loading containers" [if you want to attract container service]. It

may be necessary to install container cranes before container service
is obtained as other ports have done. Morehead City, in particular,
because of its weak bargaining position, may need a container crane to
attract service. However, the lack of inbound cargo is probably a more
serious obstacle than the lack of a container crane in attracting container
service to Morehead City.

5.   Current Balance Among Ports and Possible New Business

The analysis in Chapter 2 of the balance of flows between pro-
duction for export and consumption of imports in North Carolina and the
use of North Carolina Ports indicates that large quantities of potential
cargo already exist that are not being handled by North Carolina Ports. In
1970, approximately 500,000 tons of liner type imports destined for North
Carolina were entering ports in other states; perhaps 400,000 tons of
exports were exiting through other ports. These quantities offer a good
base for future expansion, although not all can be attracted to
North Carolina Ports for reasons already mentioned. Naturally, the
quantities are growing and will probably double by 1980.

A number of North Carolina commodities moving through ports in
other states was mentioned by knowledgeable individuals. Inland freight
rates are generally not a factor in the choice of port for these commodities
although there are freight savings due to using North Carolina Ports. A
review of several items point out these differences. For example, motor
carrier rates on textile piece goods from Kannopolis to Wilmington are
about six percent lower than to Charleston; the rail rate from Burlington
to Wilmington or Morehead City is three percent lower than to Norfolk,
while the truck rate offers a savings of nine percent. Nevertheless,
virtually no textile exports go through the North Carolina Ports compared
with Norfolk or Charleston. Freight rates on yarn and newsprint also
offer minor savings from use of the North Carolina Ports, but they are seldom
used for these items. Rates on the export of machinery from Asheboro,
Fayetteville, Charlotte, and Durham are lower to the North Carolina Ports
than to ports in other states. Furniture movements from Hickory and

High Point are lower to Wilmington than to Charleston or Norfolk. The same holds true for cigarettes from Winston-Salem and Durham. All of these commodities offer opportunities for growth of cargo through the North Carolina Ports.

6. Solicitation

Solicitation is a key element in the combination of determinants influencing the movement of cargo through a port. That is, cargo must be available from an area that can be served competitively, the port must have the facilities, ocean service must be available, and the shipper must be persuaded or solicited to use the port. The starting point among these determinants is not at all clear. Ideally, a port would like commitments from shippers and steamship companies before it makes an investment in facilities. But given today's competition among ports, investments often have to be made without firm commitments. Solicitation is not sufficient by itself to build up the volume of traffic without the ocean service and facilities, but it is critical to success if these other elements are present. As will be seen, the solicitation effort at the North Carolina Ports is not competitive with the neighboring ports.

The North Carolina SPA has a five man commerce department consisting of the Director in Wilmington, the Southern Region Sales Manager in Wilmington who covers eastern North Carolina and Tennessee, the Midwest and the Northeast, the Eastern Manager in New York with responsibility from Maine to the Potomac River, a representative in Charlotte to cover the western part of the State and South Carolina, and a representative in Greensboro to cover the central Piedmont and southwest Virginia. The man in New York functions mainly as a contact with large companies whose headquarters are located there and follows up leads from the field. The Southern Region Sales Manager and the two sales representatives are the only individuals actively working in the field to generate new business. There is also a one-man office of public information to develop advertising materials and keep the legislature informed. At the present time, there is no overseas representative, although one is planned for Europe.

Norfolk, by contrast, has eight people working in the U. S., including representatives in Chicago, Louisville, and Greensboro. It also has one man in Europe and one in Japan. South Carolina has six people in the U. S., including one in Charlotte as well as one in Europe and two in Japan. Each extra man that these ports employ is equal to one-third of the entire active solicitation effort by the North Carolina SPA. In addition, railroads, trucking companies, shipping companies, and freight forwarders at these ports have solicitation staffs that exceed the staffs of the port authorities by several times. The North Carolina-based shipping companies also do soliciting but their staffs are not as large as the firms at other ports. Each of the North Carolina Ports has only one railroad serving the ports, while Norfolk has seven.

The solicitation effort by the North Carolina SPA appears out-manned by the ports authorities in Virginia and South Carolina. These ports have representatives residing in North Carolina who participate in a wide variety of public relations activities. The freight forwarders stated that the North Carolina SPA has not been as aggressive or persuasive in soliciting cargo as ports in other states. They also claimed that high government officials in North Carolina do not give the Ports the same personal attention and financial support that ports in other states receive. Solicitation certainly influences the volume of cargo through the North Carolina Ports but the exact effects are unknown. In any case, the North Carolina Ports are at a competitive disadvantage in this determinant of port activity.

D. Summary

The examination of the determinants of port activities revealed that the outlook for continued growth at the North Carolina Ports was optimistic. The long term growth of the national economy, the recent improvement in the terms of trade, and the rapid economic development of the Southeast, North Carolina and the eastern part of the State all predict continued growth in cargo. On the other hand, the competition with ports in other states revealed problem

areas that may hold the rate of growth below that experienced during the 1960's. Growth in cargo since 1952 has been concentrated in areas that were served by ports in other states before the North Carolina SPA was formed. Much of this "natural" business has been recaptured; future business will be more difficult to obtain, particularly in areas served equally well by ports in other states.

Chapter 6

Projections of Tonnage Through
the North Carolina Ports

A. Introduction

Projections were made for three types of cargo moving over the State-
owned docks at Wilmington and Morehead City: phosphate products, liquid
products (chemicals at Wilmington, petroleum products at Morehead City),
and all other cargo. These projections were made for both 1980 and 1990; the
1980 projections are more reliable because of greater certainty about the
continuation of present trends and development of the economy. The primary
or baseline projections were based on a continuation of present trends at the
Ports and in the economy. A lower set of projections based on lower than
expected growth rates in the economy was also made. These projections are
the lower limits of the amount of cargo to be expected as long as necessary
facilities are provided. Higher projections were not furnished because of the
uncertainty in so many of the determinants. Both projections should be supple-
mented by shorter range projections for specific commodities when specific
facility expansion is being planned.

The approach and methodology for making the projections are discussed
in the next section. The projections of total cargo are set forth in
section C for the two Ports combined and then separately. Projections of
phosphate shipments and a discussion of other leading commodities are found
in section D.

B. Approach

The projections of cargo were based on specific projections of phosphate,
petroleum, and bulk liquid chemicals and a continuation of present trends in
all other commodities. The trends in all other commodities were modified by
a consideration of many determinants as can be seen in Exhibit 6-1. The
projections were based on trends in the quantity and types of cargo handled
at the State-owned Ports, the ability to compete with ports in other states,
the continued development of the State and regional economy, and rapid growth
in foreign trade (6 - 6 1/2 percent annually) at the national level with
exports exceeding imports. Projections for any one of the two Ports, however,
cannot be made with as much certainty as foreign trade at the national level.
The reason is that total growth in the State economy explains only a small

World Phosphate Situation

Texasgulf ──────────────────→ Phosphate Projections

N. C. Ports
N. C. Share of Four Ports ─── Trends ──→ Projections of Bulk Liquids

N. C. Ports ─── Trends ──→ Projections of all Other Commodities

U.S. Economy
U.S. Foreign Trade

N. C. Economy
N. C. Foreign Trade
Tributary Areas

Competition with Other Ports

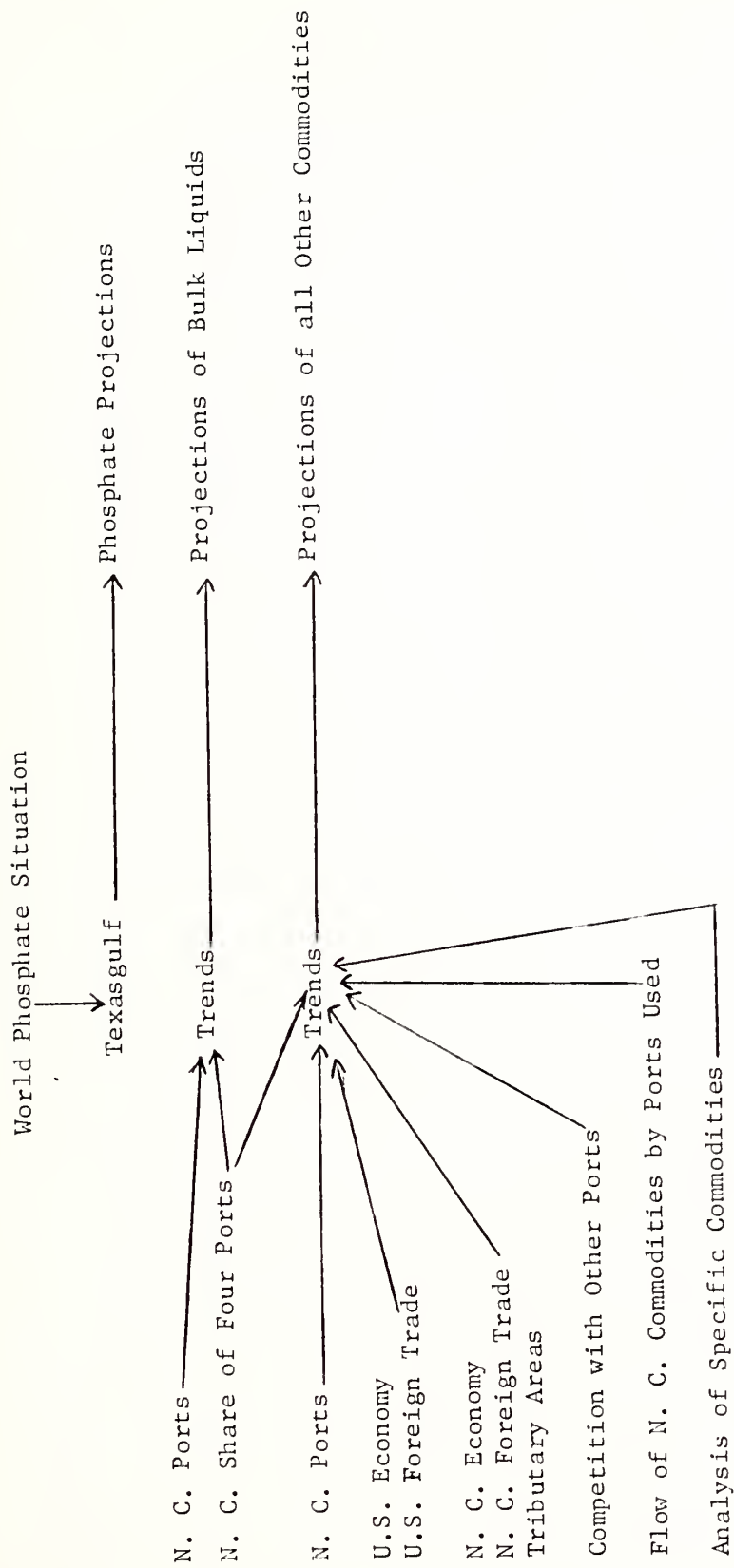Flow of N. C. Commodities by Ports Used

Analysis of Specific Commodities

Exhibit 6-1. Relationship of Determinants, Trends, and Projections

6-2

part of the cargo moving through the Ports of the State. Specific commodities produced or consumed by a small number of industries generate the bulk of the tonnage. Shipments to or from these industries are subject to wide variations as economic conditions change and as firms begin or terminate operations. Inland freight costs and transportation services can also change trends rapidly, yet they cannot be predicted. For these reasons, more disaggregated projections were not made. However, a set of alternative projections were developed, based on lower growth in the economy and in particular industries that are important users of the Ports.

The projections were made by fitting semi-logarithmic curves to the historical data using time as the independent variable. Separate curves were developed for Morehead City and Wilmington after the data for the combined Ports were analyzed. Historical data for phosphate, petroleum and liquid chemicals were deleted from the totals and projected separately. The projections were then evaluated on the basis of the determinants described in Chapter 5. The projected growth in the state and regional economy was adequate to sustain the growth in cargo based on recent trends in and projections of foreign trade. The North Carolina cargo moving through ports in other states also supported the feasibility of the projections. The North Carolina shares of principal commodities were examined and used to adjust the projections of liquid chemicals. Projections of output in manufacturing, timber, and agriculture were examined in order to validate the projections. All the determinants were considered in the validation and modification of the original projections.

C.   Projections

The projections are made at three different levels of generality with reliability decreasing as the projections become more specific. The most general projection is for all cargo at both Ports. The next lower level is cargo at each Port separately. The third level is the division into phosphate, liquid cargo, and other cargo. No distinction is made between foreign and coastwise cargo because the facilities required depend on the type of cargo, not its nationality.

1. <u>Total Cargo</u>

The projection of total cargo through both Ports is 5.5 million tons in 1980 and 9.1 million tons in 1990 (see Table 6-1). These quantities represent considerably slower rates of growth than have occurred in the past, particularly since 1967. For example, the annual rate of growth from 1967 to 1972 was 22.8 percent, compared with 16.1 percent from 1963 to 1972 (the rapid growth during the later period was due to phosphate and chemicals). The projection to 1980 represents about a 100 percent increase in eight years or about nine percent annually, which is slightly higher than the rate for the last 20 years. Growth in phosphate movements will account for about 1.3 million out of the total growth of 2.7 million tons.[1/] The remainder will be made up of liquid chemicals and other commodities. Some of the growth will probably be in commodities not presently handled. Such expectations are reasonable because of the growth of the national economy, the competitiveness of the North Carolina Ports, and the continuing industrialization of the eastern part of the State.

The projection from 1980 to 1990 represents a further slackening in the rate of growth to about six percent annually. Phosphate movements alone represent 1.4 million tons of the total growth of 3.6 million tons from 1980 to 1990. The Ports will have achieved greater maturity, and substantial shifts from other ports probably will not be forthcoming as equilibrium should occur by 1980. There are reasons to think that significant economic development will occur in all less developed nations during this time period, perhaps by 1985. These nations, in Africa, South America, and Asia, will be far more active in international commerce. New business will appear at all ports; hence, 1990 projections should be updated from time to time as more information becomes available. The 1990 projections serve the present purpose of keeping officials aware of the need to preserve options of handling that quantity of cargo in the future.

[1/] Phosphate movements are counted as coastwise inbound cargo and also as exports.

Table 6-1

Projections of Cargo Through State Ports
at Wilmington and Morehead City

(Thousand Short Tons)

Year	Cargo Total	Liquid Commodities	Phosphate Products [a]	Military, Scrap, Bulk Commodities [b]	Other Commodities
1960	860	275	-	314	268
1963	721	213	-	153	253
1964	874	226	-	259	389
1967	1,223	255	-	159	564
1972	2,759	1,094	616	28	1,032
1980	5,500	1,500	1,900	-	2,100
1990	9,100	2,100	3,300	-	3,700

[a] Phosphate products are counted as coastwise and export shipments.

[b] Not projected because these commodities are no longer handled or are so small as to be insignificant.

Source: Research Triangle Institute.

An alternative set of projections is contained in Table 6-2 along with the baseline projections for comparative purposes. The annual compound rates of growth are also listed for both projections. These alternative projections are based on lower rates of growth in the major commodities presently handled at the State-owned docks and upon a reduced rate of growth in the national economy. The continuation of energy shortage and environmental safeguards are additional reasons for projecting this lower growth rate. The 1980 alternative projection is for a total of 5.0 million tons of cargo compared with the baseline projection of 5.5 million. A drop in liquid commodities accounts for 0.2 million tons of the 0.5 million ton total reduction. The alternative 1990 projection is 7.7 million tons, or 1.4 million tons lower than the baseline projection.

2. Cargo at Wilmington

Total cargo over the State docks at Wilmington is projected to increase from approximately 1.6 million tons in 1972 to 2.7 million tons in 1980 and to 4.3 million tons in 1990. These figures, shown in Table 6-3, represent a decrease in the rate of growth experienced in the previous decade, but the actual increase in quantity will be as large from 1973 to 1980 and from 1980 to 1990 as in the previous 10 years. These projections are based on the assumption that physical facilities will be available as required and will not act as a barrier to growth. The rate of growth is based upon trends and the determinants discussed in Chapter 5. The rate of increase exceeds the national projection of about 6.4 percent through 1980 because the State economy, especially the eastern region, is growing faster than the nation, because of growth in the North Carolina share of cargo passing through ports in Virginia, North Carolina, and South Carolina, because of the continued movement of water-dependent industry (which generate large tonnages) into the South, and because of greater emphasis on the use of water transportation to conserve energy.

Table 6-2

Alternative Projections of Cargo Through
State Ports at Wilmington and Morehead City

Type of Cargo Year	Baseline Projections (Thousand Short Tons)	Annual Compound Rate of Growth (Percent) [a]	Alternative Projections (Thousand Short Tons)	Annual Compound Rate of Growth (Percent) [a]
Total Cargo				
1972 [b]	2,759	–	2,769	–
1980	5,500	9.0	5,000	7.7
1990	9,100	5.2	7,700	4.4
Liquid Commodities				
1972 [b]	1,094	–	1,094	–
1980	1,500	4.0	1,300	2.2
1990	2,100	3.4	1,500	1.4
Phosphate Products				
1972 [b]	616	–	616	–
1980	1,900	15.1	1,900	15.1
1990	3,300	5.7	3,300	5.7
Other Commodities				
1972 [b]	1,032	–	1,032	–
1980	2,100	9.3	1,800	7.2
1990	3,700	5.8	2,700	4.1

[a] 1972-1980, 1980-1990.

[b] 1972 figures are actual.

Source: Research Triangle Institute.

Table 6-3

Projections of Selected Categories of Cargo Through
State Port at Wilmington

(Thousand Short Tons)

Year	Total Cargo	Liquid Commodities	Other Commodities	Scrap and Discontinued Bulk Commodities[a]
1960	352	–	211	141
1961	350	–	180	170
1962	304	11	222	71
1963	379	42	277	60
1964	455	54	305	96
1965	479	59	354	66
1966	582	57	424	101
1967	622	60	461	101
1968	857	152	594	111
1969	885	294	528	63
1970	1,128	421	564	143
1971	1,216	549	582	85
1972	1,594	803	771	20
1980	2,700	1,200	1,500	–
1990	4,300	1,800	2,500	–

[a]/Not projected because these items have declined significantly and will probably
disappear in the future.

Source: Tables 3-9 through 3-11; Research Triangle Institute.

The composition of the projected cargo is listed on Table 6-3 by liquid commodities, and other commodities. The liquids refer to chemicals handled at the Wilmington Chemical Terminal. The scrap and bulk commodity column is included to indicate that the composition of cargo is constantly changing; these commodities were excluded when making projections because they have declined to such a degree. Some of the projected cargo in the other commodities column may consist of commodities not presently handled.

The liquid commodities are expected to increase, although at a much slower rate than that experienced from 1967 to 1972. Wilmington now handles the dominant share of chemicals and alcohols moving through the four ports discussed in previous chapters. Additional growth depends upon the growth of industries using these chemicals and upon the population and income of the region. The projected rate is about four percent annually, which appears quite conservative. Although many of these chemicals are produced from petroleum and may suffer from the oil shortage in the short run, they probably will not be affected in the long run because petroleum is more valuable as a raw material than as a source of heat. The bulk chemicals are all handled at the Wilmington Chemical Terminal and thus do not require public funds for expansion.

The growth in other commodities includes both imports and exports, although imports have dominated in the past. The future distribution will be more balanced because of currency devaluation and because some North Carolina exports that presently move through ports in other states may be expected to shift to Wilmington as ocean service improves. The rate of growth of other commodities from 1973 to 1980 will be slightly faster than in the previous eight years. One reason is that the recent rate of growth has increased substantially because of container service and should continue because of reliable scheduled service. These commodities tend to flow to all parts of the State and represent shifts from other ports. Another reason for more rapid growth is the continuing industrialization of the eastern part of North Carolina, based in part on industries that depend heavily on water transportation for supplies or marketing. The 1990 projection represents a slackening in the growth rate as the economy of the region and the Port achieves maturity.

3.   Cargo at Morehead City

The projections of cargo across the State-owned docks at Morehead
City are contained in Table 6-4. Four categories of cargo are projected
for 1980 and 1990:   total, phosphate, petroleum products, and other
commodities. As noted above, the projections have to be constantly
updated as additional information becomes available.

The projection of total cargo indicates growth from 1.2 million tons
in 1972 to 2.8 million tons in 1980 and 4.8 million tons in 1990. The rate of
growth to 1980 is slower than in the previous eight years, but the total
tonnage still will increase by two and a half times. Phosphate movements
dominate the projections, accounting for 1.4 million tons of the total
growth of 2.0 million tons by 1990. The projections of phosphate are
based on one firm, Texasgulf, Inc., and could change substantially if
other firms begin production. The petroleum products category is pro-
jected to remain constant for the next 20 years. This projection is
based on the current global network of petroleum flows. Should a
superport be placed off the coast of North Carolina or a refinery be
operated in the State, substantial petroleum could pass through the
Morehead City docks. But as it now appears, neither the phosphate nor
petroleum should require any additional facilities.

The other commodities category is more critical for public decision-
making and poses greater difficulty in making projections. It has been
relatively small in the past, but should grow as the region develops and
if ship service improves. The 1980 and 1990 projections are dependent
on additional industrial and agricultural development of the region
because the present commodities do not have sufficient growth potential
by themselves to reach the projected quantities. The projected growth
rate to 1980 is still relatively modest at roughly nine percent annually,
which is substantially less than that experienced in the last eight
years. The 1990 figure assumes a lower growth rate of about five percent
annually, which is attainable, given national and regional projections
of the economy and foreign trade.

Table 6-4

Projections of Selected Categories of Cargo Through
State Ports Terminal at Morehead City

(Thousand Short Tons)

Year	Total Cargo	Petroleum Products	Phosphate Products[a]	Other Commodities	Military Cargo[b]	Discontinued Bulk Commodities[c]
1960	508	275	–	57	125	48
1961	545	251	–	63	182	49
1962	420	171	–	65	148	36
1963	342	171	–	78	50	43
1964	419	172	–	84	119	44
1965	483	265	–	91	63	64
1966	421	240	–	100	42	39
1967	366	195	–	103	39	29
1968	577	205	168	140	31	33
1969	1,073	228	646	169	29	1
1970	1,327	303	774	223	18	9
1971	1,147	291	645	203	8	–
1972	1,165	291	616	251	8	–
1980	2,800	300	1,900	600	–	–
1990	4,800	300	3,300	1,200	–	–

[a] Includes coastwise inbound and exports.

[b] Not projected because of current small size.

[c] Not projected because these commodities are no longer handled.

Sources: Table 2-4; Table 3-6 through 3-8; Research Triangle Institute.

D. Specific Commodities

1. Phosphate

The world market for phosphate and Texasgulf capabilities have
changed recently. World demand for phosphate has resumed growth after
a period of stagnation. Latin America, and Brazil in particular, have
greatly increased their demand for phosphate rock. New mines in Africa
are developing more slowly than expected because of legal production
problems. In addition, high grade phosphate in Florida, the main source
of supply for U. S. exports, is beginning to diminish significantly.
Yet, available phosphate rock had been difficult to sell because European
countries want it in processed form (phosphoric acid, diammonium phos-
phate, and granulated triple super phosphate). Texasgulf has announced
an expansion program in both mining and processing operations: the
mining capability will double, phosphoric acid will soon be available
for export, and the capacity to produce dry fertilizer will increase
after 1980.

Table 6-5 contains data on Texasgulf exports by types of phosphate
products as well as projections made by Texasgulf. These projections
were evaluated by RTI after a review of the world market. The projec-
tions do appear feasible so long as Texasgulf completes its announced
expansion plan (some parts of the expansion have already begun). Ac-
cording to SPA officials, Texasgulf expects to ship larger amounts than
were announced publicly.

Due to mining constraints, exports of phosphate rock will not
resume until the last quarter of 1975. After that time, annual exports
should approximate 500,000 tons. Exports of dry fertilizer will total
149,000 tons in 1974 and then rise to 250,000 tons in 1975 and remain
there through 1980. The quantities should increase 10 percent annually
during the 1980 decade. Additionally, export of phosphoric acid will
begin in 1974, increase in 1975, and remain at 200,000 tons through
1980, after which it should increase at a 10 percent annual rate.

The effects of these projected shipments will be to put the Port's
phosphate operation on a solid financial footing. No additional employees

Table 6-5

Actual and Projected Exports of
Phosphate Products through Morehead City
(Thousand Short Tons)

Year	Phosphate Rock	Dry Phosphatic Fertilizers[a]	Phosphoric Acid	Total
		Actual Exports		
1969	230	74	-	304
1970	278	77	-	355
1971	215	116	-	331
1972	122	183	-	305
1973 (First Half)	55	81	-	136
		Projected Exports		
1973 (Year Total)	109	143	-	252
1974	0	149	66	215
1975	[b]	250	[c]	375
1976-1980 [d]	500	250	200	950
1990	500	650 [e]	500 [e]	1,650

[a] Granulated triple super phosphate and diammonium phosphate.

[b] Possibility of 175 thousand in last quarter.

[c] Up to 100-125 thousand.

[d] Annual total.

[e] Based on a 10 percent annual increase from 1980 to 1990.

Source: Texasgulf, Inc.

nor expenditures by the SPA will be necessary (some new storage tanks needed for phosphoric acid are being financed by Texasgulf). The loading facility will still have substantial excess capacity and the Port Authority has sought other companies and commodities to use it.

2.   Tobacco

Tobacco is another major commodity that was discussed at length in Chapter 3. Total flows through Hampton Roads and the North Carolina Ports have not shown any upward trend during the 1960's and probably will not increase during the 1970's. Growth of tobacco movements through the North Carolina Ports occurred in the past when one or more larger shippers began using Morehead City or Wilmington rather than Hampton Roads. Such movements have occurred sporadically in discrete shifts from Virginia to North Carolina that are not readily predictable. The shifts depend on ocean service from North Carolina Ports to various overseas points, container service, congestion and delays, the age of warehouses, inland transportation services and rates, and so forth. Export movements are controlled by a sufficiently small number of firms that projections cannot legitimately be made. The trend has been for the North Carolina share to increase; it probably will also increase in the future but the timing is indeterminable.

3.   Lumber and Plywood

Lumber and plywood are major imports at both Morehead City and Wilmington. Between them they account for more than half of the lumber through the four ports but only about 17 percent of the plywood. Room exists for growth in both products but depends on the pace of building activity, expansion of the domestic supply, and prices in Europe and Japan. The best available information on household formation, the construction industry and the lumber industry indicate strong growth in these commodities.

4.   Steel

The situation for steel imports is more uncertain than for lumber. The recent devaluations have reduced the price advantages of foreign steel. Price increases in energy sources, including coal, will further reduce the competitiveness of countries without convenient and inexpensive supplies of metallurgical coal. On the other hand, the share of

steel imports coming through Wilmington has been increasing and will continue to increase because of the comparative advantage it has developed in handling steel products: the docks are sufficiently spacious, the charges are lower than at Hampton Roads, adequate numbers of trucks are available, and good service has developed through cooperation of steamship companies, brokers, truckers, and the SPA.

5. Woodpulp

Woodpulp and paper products are exported through both ports from companies located in North Carolina. The future quantities will depend upon expansion of domestic supplies so that a larger proportion of production can be directed to exports. Additional mills could also increase the quantities of these products. Exports will probably increase during the next 15 or 20 years although not at a steady rate. The potential output of the region's forests compared with saturation of the domestic demand for paper and expanding foreign demand provide a favorable export growth potential.

Chapter 7

Evaluation of Future Alternatives

This Chapter is devoted to a discussion of the projections presented
in the previous chapter and to alternatives to those projections. The pro-
jections in the preceding chapter should be considered as baselines, although
they are given with high and low variations from the baseline. Baseline
projections are made as an extension to present trends and represent the
best assessment of future conditions that can be made where continuation
of existing trends, policies, and other forces that determine growth and/or
change remain the same. Baseline projections can be called projections of
"business as usual."

The level of activities projected in the previous chapter is not nec-
essarily a level for which the Ports of North Carolina should plan. The
State Ports Authority has considerable leeway in restricting future growth
at the Ports and some influence in increasing growth beyond that projected;
the Authority's influence has greater impact when long-range strategies are
implemented. The present purpose is to examine alternative strategies.

This Chapter presents a discussion of five different levels of future
activities that might be considered for the Ports and a general evaluation
of each of these alternatives. At least two of the alternatives presented
in this Chapter may be considered so unlikely that it is unnecessary for
them to be discussed: However, they are presented here for completeness
and to prepare a background for the other alternatives.

Alternatives

Alternative 1: Maximize profit by selective reduction in Port volume
                below present levels.

Each type of cargo at the State docks generates a different amount
of net marginal revenue. Net marginal revenue is calculated as the dif-
ference between the payment received for handling the cargo minus the

marginal or out-of-pocket cost for handling that cargo. To maximize profit for some level of effort involved, the State Ports Authority would specialize only on cargoes that provide large net marginal revenues. Alternately, the Authority might use as a decision criterion the classical marginal return concept. In this concept, only commodities are accepted whose marginal return is greater than or equal to the marginal costs for handling the item. In this case, the marginal costs would include a prorated charge for use of capital equipment and facilities. Capital investment decisions would be made on the basis of forecasts that the cost would be recovered in a reasonable short period. This, of course, is identical with private business concepts.

The question is raised about the difference between public and private services. Experience shows that where a consistent profit can be made in providing a service, private business will establish operations to provide such services unless prevented. Specifically, where there are opportunities to recover investments and make a profit in handling specific types of cargo, it can be expected that private business will take advantage of the opportunities. In North Carolina, however, private port service deteriorated in the few years before the State Ports Authority was established. Consequently, importers and exporters were greatly handicapped. This situation minimized the ports as stimulators of economic development. The State Ports Authority came into existence to fill the need in which the private sector had lost interest.

This move on the part of the State of North Carolina was justified on the basis of the existence of other potential benefits. Chapter 4 of this report describes and provides estimates of current benefits. The chapter shows that a substantial amount of personal income in North Carolina is associated in some manner with activities at the Ports in Morehead City and Wilmington. Some of this income would terminate if the volume of cargo at the State Ports was reduced below its present level in order to maximize profits in a manner similar to private business. Consequently, it appears to be inconsistent that the State Ports

Authority would be considered as a provider of public services and at the same time be operated under the criteria of maximizing profit.

Alternative 2: Maintain present levels of activities at the State Ports and forego the anticipated growth.

All businesses have the choice of reducing, maintaining, or increasing their levels of activities within limits depending on the goals and resources of the business and the costs. In the case of the State Ports, their current operations return to the people of North Carolina substantial benefits for the investments that have been made. Income from direct effects, that is, employment in the localities near the two Ports, is more than $12 million a year. Other income effects total almost $200 million per year; these effects are in indirect and supplementary employment. This income, in turn, results in more than $21 million a year in taxes for State and local government.

Regardless of how effective the Ports are considered to be, there remains underemployment in the State of North Carolina that can be benefited by the direct or indirect effects of the Ports.

The job of the Ports as a stimulator of economic development has not been completed. In the Coastal Region counties, greater portions of people are underemployed, and it is within the Coastal Region that the Ports have the greatest effects, as shown by the data presented in Chapter 4. Available data also indicate that economic development is taking place at an accelerating rate in the Coastal Region. Much of this development may be dependent on Port activity to some extent; the overall amount of development that will occur within the Coastal Region will also be determined by the general climate and an attitude of optimism that is held by observers of economic development in this region. Data show that a sizeable percentage of the firms which have recently located in the Coastal Region rely upon the Ports for imports or exports, and it can be anticipated that many future firms will do likewise. Regardless of whether economic growth can be credited to the State Ports in part or in total, it is obvious that many of the new firms to come to the Coastal Region will be anticipating service from the Ports.

Consequently, it seems to be premature to consider that conditions involving the State Ports have reached a leveling off point and premature to consider that the State Ports Authority has completed its job in the stimulation of economic development. Furthermore, there is some unused capacity at the Ports, especially at Morehead City, that can be put into effective and profitable use within the next few years with little additional investment. The projections made in this study indicate how additional growth is occurring; this growth is considered in the next alternative.

Alternative 3: Plan for growth indicated by the projections in this study.

The projections presented in Chapter 6 of this study are considered as baseline projections. One of the primary deterents of regional growth is the growth of national imports and exports, and consequently, independent projections of the level of this factor were taken into account in making baseline projections for North Carolina. To some extent, the projections assume the level of economic pressure from outside the State to continue to develop.

The baseline projections indicate that the volume of activity at the State Ports will nearly double between 1972 and 1980. Furthermore, there will be a greater absolute increase, but not another doubling, between 1980 and 1990. It is thought that the Wilmington Port will reach a mature status with considerable stability in the types and levels of cargo handled and in ocean service. At that time, the Wilmington Port will be handling a diverse mix of cargo. On the other hand, it is unlikely that the Port at Morehead City will stabilize to the same extent in this time period because the Port services a smaller number of commodities and is subject to greater swings and shifts due to economic conditions. For instance, it is projected that two-thirds of the cargo handled there in 1990 will be phosphoric products; consequently, Morehead City Port volume will mirror the world phosphate market.

By 1980 benefits to the people of North Carolina because of the Ports can be expected to exceed a half billion dollars a year as measured by direct, indirect, and supplementary effects. State and local

tax revenue associated with this level of income will be in excess of $50 million per year. The employment and income effects to be realized from future growth will be proportional to past growth although a substantial amount of phosphate and other bulk commodities are involved. Phosphate shipments do not support the level of employment and income that equivalent tonnages of other commodities do. It can be expected that the benefits from the Ports as measured in employment and income will grow to approximately three times their present level by 1990. There is reason to believe that the total future impact of the new cargo to be handled will be greater than the total impact in the past. This is due in part because a good deal of the present cargo was handled by other ports in the past, and no new employment outside the immediate port area was created. Future growth will consist of a higher proportion of goods produced or consumed for the first time in North Carolina that will support new employment and generate new income in the State.

The growth anticipated by the baseline projections will take proportionally less investment (measured in constant dollars) in the future than has been the experience in the past. It is anticipated that no significant investment on the part of the State will be necessary to accommodate the phosphoric products that will be involved. In addition, handling of cargo at the two Ports should become more efficient as volume increases and new techniques are brought into operation. For example, as the size of the ships being serviced at the State Ports increases, then the tonnage handled per berth space will increase. This means that investments in the Ports in the future will return a larger amount of revenue provided that Port charges are adjusted to price levels as often as necessary.

Total capital expenditures for new construction at the two Ports during the period they have been owned by the State has been slightly less than $23 million, excluding the cost of the phosphate handling facilities. This is approximately the magnitude of the State and local revenue effects of one current year of Port operations. Were it not for inflation, ths same amount of capital expenditure in the future

would return greater benefits to the State. Some of the future gains in efficiency will require capital expenditures for new types of equipment; however, if these are justified on the basis of their providing a net benefit to Port operations, then, per se, they will provide greater return per dollar.

These considerations suggest that, dollar for dollar, capital expenditures at the State Ports in the future will be more beneficial than even those in the past if growth follows the baseline projections.

Alternative 4: Plan for volume substantially greater than the baseline projections.

It is probable that aggressive promotion and solicitation by the State Ports Authority on a scale larger than at present would result in the State capturing a larger percentage of the cargo moving through ports in other states, especially nearby states. This is indicated elsewhere in this report. Some cargo is shifted from one port to another for reasons that are not economic. These non-economic reasons are based on a variety of interests of shippers. Experience shows that aggressive solicitation in the interest of any port can succeed in capture or recapture of cargo handled by other states; tobacco is an example.

Aggressive solicitation in the past by the North Carolina State Ports Authority served a more general purpose than merely increasing the cargo volume at the Ports. It served the purpose of increasing the number of ships calling at the State's Ports. There is some minimum amount of cargo that is critical to a satisfactory level of ocean service.

Aggressive solicitation, however, seems to be inconsistent with the basic concept of public services. Public services are provided to meet the theretofore unmet needs of people. While some competition between public services is healthy in that it promotes efficiency and innovation, too much competition can be detrimental to public interest in that it increases the cost to the public. A simple example will illustrate this. If Port A captures cargo by aggressive solicitation that was previously handled by Port B, B is in the position and has the justification to lower its charges in some manner, or to provide increased support for aggressive solicitation on their part. When cargo shifts from one state to another, little of the economic effects move with the shift. The employment and

income associated with manufacturing or processing the commodities in-
volved are relatively fixed in location. Direct employment in the port
area may change but not indirect and supplementary employment. This
means that for North Carolina the benefits in employment and income are
only eight percent of the average benefits; each ton of cargo that shifts,
on the average, yields personal income effects of about $6 instead of the
average of $76.

The future operation of the two Ports in North Carolina is essen-
tially assured, barring major national or international catastrophe.
Consequently, one reason for aggressive solicitation in the past no
longer exists. The focus should be shifted to promotion of economic
development in the Coastal Region counties; aggressiveness for this
purpose seems appropriate.

Alternative 5: Plan for growth at the projected level but reshape the
                functions of the two Ports.

It appears that the most sensible and feasible plan of action for
the State Ports will be planning for the level of activities projected
in Chapter 6. This level is consistent with healthy economic growth
within North Carolina and vigorous growth in the Coastal Region. The
projections imply the maturing and strengthening of the Port at Wilming-
ton as a core of an important trading center along the East Coast. One
problem for Wilmington is that there is lack of balance between imports
and exports, imports being five times larger. The immediate result is
that ships unload at Wilmington and depart with unused capacity. For
container ships, empty containers must be handled instead of revenue-
yielding laden containers. An ultimate result of the lack of balance is
to place Wilmington at a disadvantage in attracting regular and scheduled
ocean service.

In the case of Morehead City, a relatively small number of industries
rely upon the Port. The Port handles a small number of bulk commodities
in large quantities. Consequently, Morehead City is less dependent upon
regular and/or scheduled ocean service for general cargo than is Wilming-
ton. The commodities from Morehead City often move in quantities that
are sufficiently large to attract bulk cargo ships. On the other hand,

commodities of a general nature are handled in quantities too small to attract regular ocean service at Morehead City. Furthermore, many general commodities, because of their value or fragile nature, now or will soon require containerization. Morehead City can handle containers with a special attachment on a gantry crane as is done at Wilmington; however, the method is considered to be inadequate by many ship operators who prefer a traveling-bridge, container handling crane. Most likely, almost all tobacco will be shipped in containers by 1980. Hence, Morehead City may require container handling facilities that could cost several million dollars if general cargo is to continue to be handled there. Taking tobacco into account, the Port has a large import-export imbalance; in this case the lack of balance is lack of imports. In 1972, exports were 4.7 times as large as imports.

It appears that the position of the State with reference to ocean service would be improved if most of the growth of cargo shipped in small lots occurred at Wilmington rather than at Morehead City. Additional growth in general cargo at Wilmington would be additional assurance of good ocean service there. This is especially so if import-export balance is improved.

This concept suggests that Morehead City should specialize in bulk items and cargoes moving in quantities large enough to independently attract eligible ships. The concept can be justified on the basis that the splitting of break bulk cargoes between the two Ports serves to weaken the attractiveness to shiplines of both Ports. The volume of general cargo at the Port of Wilmington is small in comparison with that at other general ports being served by the steamship lines whose services are needed. This point can be seen from a different view by considering what would happen if there existed only one port in this State. It is highly unlikely that much support for a second port could be generated outside the immediate area of the proposed port location.

The benefits of this alternative over the alternative of following the baseline projections cannot be quantified. Basically, employment and income would be at or near the same level for both alternatives. The difference would be in improving the overall competitive position of the

State in deep water commerce and adding insurance for healthy growth. These likely would result in net increases in volume and thus in employment benefits; however, the net increase cannot be forecast.

The objective of this modification of the functions of these two Ports would be to ship essentially all small lot general cargo and less than shipload cargoes via Wilmington during the next few years. This alternative would not include specific commodities moving in steady streams to Morehead City such as woodpulp or commodities for which Morehead City can continue to give individualized, special service. This change need not be made permanent because the general cargo potential for Morehead City might increase to the point that it would attract regular ocean service there. Information on commodities by type and volume should be periodically reviewed to ascertain whether general cargo should be promoted for Morehead City.

Chapter 8

Conclusions and Recommendations

A. General

This Chapter presents the conclusions reached in the study and the recommendations that were derived.

In general, it can be said that the North Carolina State Ports are well operated. There are many indications that decisionmaking within the State Ports Authority has been sound, has contributed to continually improving operations at the Ports and thus has enhanced the future viability of the Ports.

B. Conclusions

1. The services of the Ports benefit the people of the State of North Carolina in a very substantial way. In 1972, each ton of cargo passing over State-owned terminals generated $76 on the average in personal income among North Carolinians. Most of the cargo handled at the State Ports has been produced by or will be consumed by North Carolinians. The services of the Ports are of greater benefit to North Carolinians when the cargoes involved have originated in or are imports destined for North Carolina because of the employment and income created.

2. The availability of services at the two Ports has been a significant factor in the stimulation of economic development in North Carolina, especially in the eastern part of the State. In some eastern Regions, 20 percent of their development since 1960 may be due to the Ports. The Ports are an integral part of the economy of the State, with their services essential to the operations of a large number of firms and the employment of about 32,000 people. The use of in-State Ports saves industry more than $2.8 million each year in motor freight and rail freight charges. Thus, the Ports have been accomplishing the intent of the General Assembly as stated on Page 1-1 of this report. Additionally, the Port at Morehead City is frequently used by and is important to the U.S. Marine base located nearby.

3. The Port at Wilmington has matured to the point that its con-
tinued successful operation is assured. Demand for services will
increase at a compounded rate of 5.7 percent per year through 1990.

4. Continued growth in volume at Morehead City is assured. Volume
will increase at an annual compounded rate of 8.1 percent through
1990. Volume will consist primarily of a few commodities shipped
in large quantities for industry within Morehead City's small tribu-
tary area; two-thirds of the volume will be phosphate products. Little
growth is expected in miscellaneous commodities that move in small lots.

5. The outlook for the State Ports on all other counts is very good.
Volume at the Ports is expected to reach a level in 1980 (5.5 million
tons) that is double that of 1972 and to reach 9.1 million tons by 1990.
Much of the anticipated growth will be associated with new firms or
with expanding firms in North Carolina and less growth will come from
commodities that are shifted from other ports.

6. There are reasons to believe that the Port operations will be of
greater benefit to the State in the future than in the past. Based on
tonnage alone, which is expected to more than triple by 1990, the bene-
fits will be more than tripled. On the average, each ton of cargo will
benefit the State more because of its processing will occur in the
State. Moreover, it is anticipated that a larger share of the effects
of the Ports will remain within the State in the future. Consequently,
a ton of cargo will generate more income for North Carolinians in the
future than the equivalent amount did in the past.

7. The lack of balance between imports and exports for both Ports
is projected to continue. Wilmington has a greater volume of imports
than exports, which the opposite is true for Morehead City. Wilming-
ton has 89 percent of the imports and Morehead City has 76 percent of
the exports. Lack of balance will continue to hinder both Ports.

8. The Port at Morehead City will continue to specialize in relatively
few commodities and cannot be expected to develop into a general port
in the next two decades. The Port of Wilmington will grow as a general
port with additional port-related services being initiated in the area.

C.   Recommendations

During this study of the State Ports, opportunities for further improvements in decisionmaking and operations were specifically sought and evaluated. The results are presented in this section. The recommendations are designed to facilitate the achievement of the General Assembly's goal for the Ports which is to stimulate and promote economic development throughout North Carolina and especially in the Coastal Region of the State.

The recommendations are grouped below into planning, administration and strategy classifications.

Planning

1.   Plan for overall volume to grow at an annual rate of nine percent during this decade as projected.   However, more formal long-range planning should be accomplished and plans should be shared with other agencies.

Data collected during the study show that the Ports have benefited many of the people of the State and will continue to do so for many years. Furthermore, projections of future Port activities indicate that 1980 volume will be about double that of 1973 and 1990 volume will be triple. This means that the necessary capital additions must be anticipated years before they are needed because of a four or five year gestation period. The SPA has recognized and taken this gestation time into account in its current planning activities. A difference is that new facilities must be added at a continually increasing pace--in the near future, new facilities must be added at twice the pace as in the past. Hence, planning is now more necessary and can be more beneficial.

The existence of a long-range plan will enhance the image of the two Ports. If the plan has the endorsement of significant facets of the State government, some private firms may be attracted to the Ports earlier than would otherwise be the case. Additionally, the Port plans can be used by government agencies to modify their decisions to some extent. For example, the economic development management personnel of the Department of Natural and Economic Resources can better key their action plans to economic development activities in the Coastal Regions to support the Port's plans.

2.   Derive a layout of the two Ports as they will appear in 1990
handling the volume of cargoes that are projected. The layouts
should show berths, dock storage space, warehouses, and other large
features such as cranes. Furthermore, this layout should be updated
and extended in time every five years. Additional detail may be
needed in the projections of some commodities because they require
unique port facilities.

The present projections are the best availbale basis for future
planning and the study team recommends their use in preparing a 1990
layout. Because the projections are based on present trends, derived
plans will be in harmony with anticipated economic development and
other changes. Moreover, the projected volume for 1990 represents a
potential for maximum benefits to the State for the Port effort in-
volved. If another level of 1990 volume is sought by the Ports, ad-
ditional effort to counter trends may be required.

3.   Design and implement a systematic procedure for capital expendi-
ture planning that will depict, quantitatively, the justification for
the expenditure and the rate of capital return that is expected.
Furthermore, each capital expenditure request should be accompanied by
a plan for the evaluation of the capital project with reports made to
relevant authorities.

Information available to the study team indicates that the invest-
ment decisions made in the past were as sound as could be expected with
the information on hand at the time of the decisions. Nevertheless,
there has been some uneasiness about a few very early decisions such as
those concerning the phosphate handling facility investments. Informa-
tion on which to base future decisions may be less reliable than that
in the past because many changes are anticipated; hence, it will be good
judgment for the State Ports Authority to have a system to achieve wide
agreement for their capital expenditure plans. Important assumptions in
future plans should be agreed on by other planning bodies in the State.

The evaluation component for capital expenditure plans has been
recommended on the general posture that:

a.   Evaluation planning contributes to more effective decisionmaking because of the extra considerations that are usually uncovered.

b.   Government in general is moving towards more public service accountability.

c.   Effective evaluation results in improvements in planning processes and subsequent decisionmaking.

4.   Ascertain whether the State Ports Authority now controls sufficient land to handle the volume in 1990 plus some reasonable allowance for greater than projected growth.   If present holdings are inadequate, steps should be taken to acquire the additional land needed.

The most constraining factor to port development other than lack of growth in trade is lack of space.   Hence, space requirements for the future need to be documented.   Also, rights to the additional space needed, if any, should be acquired now because land values will continue to rise as the Ports develop.   Likely, much of the land near the Ports will be more intensely developed by private firms, and will be far more difficult to acquire later by the State Ports Authority should the need arise.

5.   Ascertain the probable size of ships to be handled in 1990 at State-owned terminals and obtain the best estimates of other operating parameters for use in making long-range plans.   Such operating variables as loading and unloading rates relative to present rates will be important in long-range planning.   Information about ship sizes and operating variables should be obtained from observers of maritime technology.

In recent years, ship lines have significantly changed their equipment.   Larger ships and some specially designed, limited-purpose ships such as containerships have been put into service.   The State Ports Authority has kept abreast of changes of these types and has made changes at the Terminals to accommodate them.   However, there are more changes to come, and if substantial growth in ship size occurs, the State Ports will be in better condition to serve them if future sizes are anticipated.

6. Conduct a careful analysis of berth occupancy rates for the
purpose of determining an optimum range of occupancy rates for the
North Carolina Ports. The problem in brief is this: berth space is
very expensive to provide and the higher the occupancy rate, the
higher the revenue collected for use of the berth. On the other hand,
the lower the occupancy rate, the less likely a ship would be turned
away or forced to wait because of lack of berthing space. The reso-
lution of these two conflicting factors will require an intensive and
intricate analysis; methodology is readily available for such analysis.

One of the characteristics of the North Carolina Ports that has
been important in recent growth is the lack of congestion. This will
continue to be an important factor to offset the disadvantages of
small ports. Hence, the analysis should be designed to allow a berth
occupancy rate for North Carolina Ports that is lower than the East
Coast average. On the other hand, the analysis should make explicit
the extra costs involved in planning for less congestion.

Administration

7. Review present activities in the Ports Authority and other
agencies to ascertain whether there is adequate review and analysis
of all transportation rates affecting present and potential cargo
for the Ports. If review and analysis is not adequate, steps should
be taken to make it so.

As reported earlier, inland rates for commodities in foreign
trade determine to a large extent the Ports through which they flow.
Inland rates are, in turn, determined by several factors such as the
mileage involved. However, rates are not always consistent and lo-
gical; some discriminate against one or more ports or favor a specific
port. Moreover, there are so many different rates that their surveil-
lance is time consuming. Probably, someone without other duties is
needed for the purpose.

8. Review and revise the functions and assignments of Port Solici-
tors. One of the purposes for the revision will be to set a standard
of allocation of Solicitors' time between servicing existing accounts
and soliciting for new business. Another purpose will be to emphasize
economic development through new imports and exports. As pointed out
above, new import and export business means greater benefits to the

State than the capture or recapture of existing business from other ports. Furthermore, since there is substantially less unemployed labor than a decade ago, economic development in the future will mean more than the creation of new jobs. It will involve upgrading existing jobs and other changes that will increase the productivity of labor and consequently, increase wages. This means that the job of the State Ports Authority Solicitor will become more complicated and that solicitors should become economic development specialists to a large extent. It is therefore recommended that regular lines of information exchange be established between the economic development activities of the Department of Natural and Economic Resources and the Solicitors, that Solicitors be given training in promotion of economic development, and that their assignments be reformulated to promote economic development.

9. <u>Set up a priority list of commodities to be solicited and instruct Solicitors to follow these priorities.</u> Priorities should be based on a combination of three factors that might be combined into a single index. These are:

    a.   Expected growth rate of commodity in foreign trade,

    b.   Net revenue to Ports after all costs are accounted for,

    c.   Contribution of commodity to increasing employment and income benefits to North Carolinians.

This study has shown that the levels of shipments are going to grow at different rates for different reasons. Phosphate rock and related commodities will increase because of Texasgulf activities and require coordination and not solicitation. Little growth is expected in tobacco; hence, these accounts also do not require solicitation but a type of monitoring to insure that all difficulties are known to Ports administration early enough to take corrective action.

Nationally, agricultural products such as grains are expected to lead export growth. However, North Carolina does not produce the types of agricultural products that are involved except for local consumption. Therefore, growth in goods through North Carolina Ports will consist primarily of manufactured goods. It is not clear at this time what commodities are most likely to grow because of unsettled international

economic matters. Hence, this factor requires monitoring, further analysis, and more detailed projections.

Another factor that should be taken into account for setting solicitation priorities is the net revenue to the Ports for handling commodities. This factor bears directly on the profit or loss sustained by the Ports. As mentioned before, some commodities are handled at a loss because handling charges are too low. Handling charges are set by a conference of port administrators and may be too low for North Carolina Ports to cover their costs. Solicitors should not seek such cargo if other things are equal.

The third factor in priority setting is the benefit of commodities to the State in terms of total employment and income benefits. Total employment and income potential throughout the State should be taken into account. This means that new commodities to be produced in labor-intensive industries of North Carolina would recieve highest priorities.

Strategy

10. <u>Study means by which better balance between imports and exports can be achieved, especially for Wilmington where the need is greater.</u> One means could be an intensive campaign to promote general cargo for export through Wilmington. This move will further tend to improve the stability of Wilmington as a general port. Balance in imports and exports is important to the Port in sustaining growth.

Availability of cargo is what attracts ships; this is thoroughly discussed in Chapter 5. More general cargo at Wilmington, especially more exports, will help the Port. Individual bulk commodities at Morehead City are sufficient inducement for the ocean service needed there and this type of service is more certain than general cargo service at Wilmington. The long term view of Morehead City is a Port specializing in a relatively few commodities moving in steady streams to the Port where they recieve individualized, special handling. Wilmington will provide service to a large and diverse group of general commodities moving in small, irregular quantities. Their movement will depend greatly on the quality and frequency of ocean service.

11. Carefully review the appropriateness of offering new services at the Ports. One of the important benefits of the State Ports is the stimulation of growth in port-related businesses at Morehead City and Wilmington. Hence, the private sector should be given the first opportunities to provide additional services that are in demand.

However, it must be realized that, because of conditions and rates at competitive ports, private firms could not compete profitably. This may force the SPA to provide some new services even though financial losses are expected. Such potential losses require careful review and justification in terms of overall economic benefits.

Examples of extended service are the provision of long-term storage and refrigerated storage. Where special storage of commodities must be provided for competitive reasons, rates charged for this service should be higher than prevailing rates in the locality. This is justified on the basis that space near the docks is more valuable and that it should induce and actively promote growth of private warehouses. Whenever demands for new services are identified, attempts should be made to find private firms to provide them.

12. Take steps to maximize interstate Port Cooperation that will result in a net benefit to citizens of the three States. This may be accomplished by initiating a three-state conference to discuss common problems and means for promoting economic goals for the States involved.

Additionally, projects planned that may capture cargo from another port should be reviewed closely to assess the net increase in benefits to the State. The rationale for stressing cooperation and limiting interstate port competition was given in Chapter 7. Obviously, there is a point, beyond which, competition aids only shippers and hinders the ports involved. Primarily this is because the ports may incur additional costs to maintain aggressive competitive positions. In as much as the Ports of North Carolina are subsidized to any extent by the public, the additional costs would be borne by the public. It has already been reported that the continued operation of the State Ports is assured; hence, the State Ports need only to insure that Port and related services are as good or

better than competitors and meet the demands for port services by businesses in North Carolina.

Appendix A

<u>Specified Commodities Excluded from
Liner - Type Items</u>

Appendix A

Specified Commodities Excluded from
Liner – Type Items

Exports	Imports
Wheat	Wheat
Rice	Rice
Barley	Barley
Corn, Maize	Corn, Maize
Rye, Oats	Rye, Oats
Any unmilled cereal	Any unmilled cereal
Oilseeds – Peanuts, Soybeans, Flax, Cottonseed	Sugar, cane and beet, raw or refined
Cotton	Pulpwood
Phosphate rock Building stone & slate Sand, Gravel Gypsum and limestone	Phosphates, crude and apatite
	Gypsum plasters and crude limestone
	Sand, except metal bearing gravel
Iron ore & pyretes	Iron ore and concentrates
Nonferrous metal scrap	Copper ore and concentrates Nickel ore and concentrates
Coal-peat, coke, etc.	Lead ore and concentrates Zinc ore and concentrates
Petroleum products except gasoline, lubricating oils and grease, pitch and asphalt	Tin ore and concentrates Manganese ore and concentrates Bauxite ore and concentrates Ore and concentrates of nonferrous base metals
Gas, natural and synthetic	Nonferrous metal scrap
Special transactions – not spec.	Coal, coke Peat moss
Live animals	Petroleum products except lubricating oils and greases
Arms & military equipment	Special transactions not classified according to kind
	Live animals
	Arms and military equipment
	Items with estimated value under $251

Source: U.S. Bureau of the Census <u>Domestic
and International Transportation
of U.S. Foreign Trade: 1970</u>,
U.S. Government Printing Office,
Washington, D.C., 1972, pp. A-2--
A-14.

Appendix B

Glossary

Appendix B

Glossary

Bulk Cargo - low value commodities, usually raw materials, that can be
     handled by machinery with very little labor input. Some examples
     are petroleum products, sand, chrome ore, pulplogs, and phosphate.

Coastwise Shipping - all shipments to or from U.S. destinations; also
     referred to as domestic shipments or domestic cargo.

Container Crane - a crane with a four point lift, specially designed to
     load and unload containers from ships.

Containers, Container Ship - a container is a rectangular metal box that
     can be placed on a truck trailer chassis. Containers usually are
     carried on ships especially designed for that purpose.

Direct Effects - employment and income resulting from firms and agencies
     that provide Port-related services such as stevedore companies, steam-
     ship agents, the Coast Guard, bunks and so forth.

General Group - all commodities moving through the ports except for tobacco
     and special group items.

General-Type Cargo - also called general cargo; high value, non-bulk
     commodities. No good definition exists so liner-type cargo was used
     for purposes of analysis..

Foreign Shipping - the total of imports and exports.

Hampton Roads - the complex of deep-water ports in Virginia consisting of
     Norfolk, Newport News, Portsmouth, and Chesapeake. Norfolk is
     occasionally used as a synonym for Hampton Roads or as representative
     of the Hampton Roads Ports.

Hogshead - straight sided barrel used for storing and transporting tobacco.
     Each hogshead contains approximately 1,000 pounds of tobacco.

Indirect Effects - employment and income in firms that produce goods for
     export or process imported materials such as phosphate mining or
     furniture factories that use imported lumber.

Inducement Service - ships call at a port where cargo exists in sufficiently
     large quantities to induce them to stop. The ship may not pick up cargo
     on such a stop if it has commitments at some other port.

Input-Output Model - a set of equations that represents output in one
    industry as inputs to all other industries and final consumption (and
    vice-versa). The model clearly demonstrates the interrelationships
    among all industries.

Liner-Type Cargo - all cargo except specified bulk commodities such as
    wheat, corn, cotton, oilseeds, iron ore, coal, nonferrous metal scrap,
    petroleum, phosphate rock, stone, sand, and gravel. See general-type
    cargo.

Military Cargo - cargo moving through the Port of Morehead City to or from
    the Marine Base at Camp Lejeune.

Ocean Terminals - the name of the publicly-owned terminal at Morehead City.

Private Terminals - docks that are owned by individuals or companies. Such
    docks may be for the exclusive use of the owners or may be open to the
    public. The private terminals at both Wilmington and Morehead City
    specialize in bulk commodities.

Regular Service - ships call at a port on a regular basis but do not
    adhere rigidly to a published schedule.

Scheduled Service - ships call at a port to drop off and pick up cargo on
    a rigid schedule that is published in advance.

Secondary Effects - employment and income resulting from the consumption
    expenditures of employees connected with the direct, indirect, and
    supplementary effects.

Short Ton - a ton of 2,000 pounds.

SPA - the North Carolina State Ports Authority.

Special Group - specified commodities, including all coastwise shipments
    whose origins or destinations are known with certainty. The major
    items are bulk chemicals such as methanol, concrete, woodpulp,
    asphalt, phosphate, and fishmeal.

State Docks - the name of the publicly-owned terminal (SPA) at Wilmington.

Supplementary Effects - employment and income in firms connected to the
    indirectly affected firms by interindustry relationships such as
    trucking firms.